RINNOVA COND

User manual and installation instructions

CE

BIASI

WARNING

Congratulations on your selection.

Your modulating boiler is electronically adjusted and ignited.
- highly efficient;
- sealed chamber.

Unlike traditional boilers, your condensation boiler makes it possible to recover energy by condensing the water vapour contained in the flue gas; that is, with equal heat production, it **consumes less gas** and furthermore, the flue gas contains **fewer substances that are harmful** to the environment.
The materials used and the regulation system offer safety, high levels of comfort and energy savings so you can appreciate the maximum advantages of autonomous heating.

DANGER: Information marked with this symbol must be observed to prevent mechanical or generic accidents (e.g. injuries or bruises.

DANGER: Information marked with this symbol must be observed to avoid electrical accidents (electrocution).

DANGER: Information marked with this symbol must be observed to avoid the danger of fire or explosions.

DANGER: Information marked with this symbol must be observed to avoid heat-related accidents (burns).

ATTENTION: Information marked with this symbol must be observed to avoid malfunctions and/or material damage to the unit or other items.

ATTENTION: Information marked with this symbol is important information that must be read carefully.

IMPORTANT

- ✓ **The manual** must be read carefully in order to use the boiler in a rational and safe manner. It must be stored with care as it may be necessary to consult it in the future. If the unit is transferred to another owner, the manual must accompany the boiler.
- ✓ **The first ignition** must be carried out by one of the Authorised Service Centres, which validates the warranty from the date on which it is performed.
- ✓ **The manufacturer** declines all liability for translations of this manual from which incorrect interpretations may result. It cannot be considered responsible for failure to observe the instructions contained in this manual or the results of performing manoeuvres that have not been specifically described.

DURING INSTALLATION

- ✓ **Installation** must be carried out by qualified personnel who shall be responsible for compliance with all applicable national and local laws and standards.
- ✓ **The boiler** is used to heat water to a temperature that is lower than the boiling point and must be connected to a heating system and/or a domestic hot water distribution network that is compatible with its performance and its power.
  The boiler must be supplied with **Methane gas (G20) or Butane (G30) or Propane (G31)**.
  The condensate discharge must be connected to the residential condensate discharge duct and must be possible to inspect it (UNI 11071 and correlated standards).
  The boiler must only be used for the purpose for which it was designed, furthermore:
  - It must not be exposed to atmospheric agents.
  - It must not be handled by children or unqualified persons.
  - Prevent incorrect use of the boiler.
  - Avoid manoeuvres on the sealed devices.
  - Avoid contact with hot parts during operation.

DURING USE

- ✓ **It is prohibited and dangerous** to obstruct, even partially, the air intakes for the ventilation of the room where the boiler is installed (UNI 11071/08);
- ✓ **Repairs** must only be carried out by Authorised Service Centres using original spare parts. Therefore, in the case of a problem, deactivate the boiler only (see instructions).
- ✓ **If you smell gas:**
  - Do not turn on electric switches, the telephone or any other object that could create sparks.
  - Immediately open up the doors and windows to create an air current that cleans the room.
  - Close the gas cocks.
  - Request the intervention of professionally qualified personnel.

WARNING

- ✓ **Before starting the boiler**, it is recommended to have professionally qualified personnel check that the gas supply system:
  - Is perfectly sealed.
  - Is dimensioned for the flow rate necessary to the boiler.
  - Is equipped with the safety and control devices required by current standards;
  - Make sure that the installer has connected the safety valve discharge to a discharge funnel. The manufacturer is not responsible for damage caused by the water released when the safety valve opens if it is not correctly connected to a drain.
  - Make sure that the installer connected the condensate siphon discharge to a specific discharge funnel (UNI 11071 and correlated standards), which must be implemented in order to avoid the condensate from freezing and ensure its correct evacuation.
- ✓ **Do not touch the unit** with wet or moist body parts and/or with bare feet.
- ✓ **If performing structural work or maintenance** near the flue gas duct and/or the flue gas exhaust devices or their accessories, turn off the unit and, when the work is completed, have its efficiency checked by professionally qualified personnel.

Unit in category: II2H3B/P (gas G20 20 mbar, G30 30 mbar, G31 30 mbar)
Country of destination: EN
This unit is compliant with the following European Directives:
Gas Directive Gas 2009/142/EC
Efficiency Directive 92/42/EEC
Electromagnetic Compatibility Directive 2004/108/EC
Low Voltage Directive 2006/95/EC
In order to constantly improve its products, the manufacturer reserves the right to change the data provided in this documentation at any time and without notice.
This documentation is provided for information purposes and cannot be considered as a contract with third parties.

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Models	*Boiler certification code*
RINNOVA COND 25S	M160.2025 SM/...
RINNOVA COND 35S	M160.3035 SM/...

1 BOILER DESCRIPTION

1.1 Assembly view

The boiler model and serial number are printed in the warranty certificate.

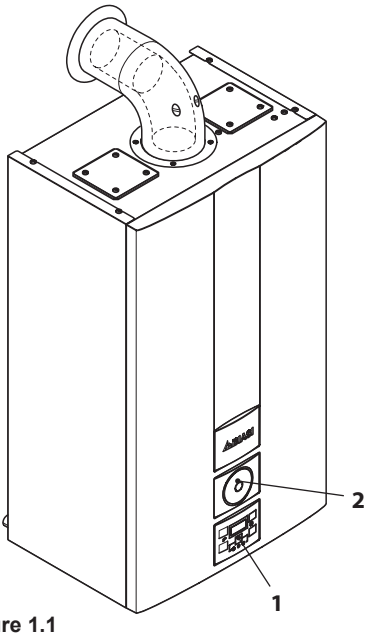


Figure 1.1

1 Control panel
2 Housing for a possible timer

1.2 Shut-off valves and cocks

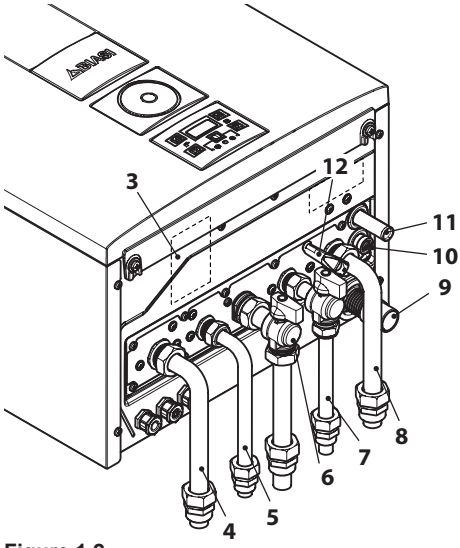


Figure 1.2

3 Gas supply label
4 Heating delivery pipe
5 Domestic hot water outlet pipe
6 Gas cock
7 Domestic hot water inlet cock
8 Heating delivery pipe
9 Condensate discharge pipe
10 Heating circuit emptying cock
11 Heating circuit safety valve discharge pipe
12 Heating circuit filling cock

1.3 Control panel

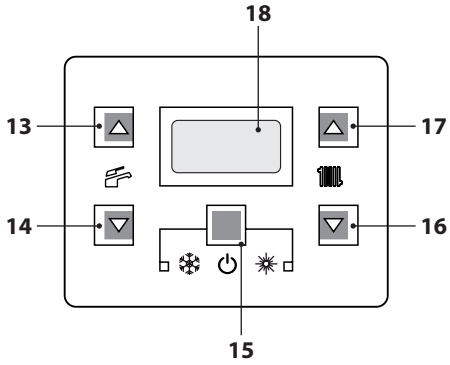


Figure 1.3

13 Domestic hot water temperature increase key
14 Domestic hot water temperature reduction key
15 Reset/Stand-by/Winter/Summer key
16 Heating temperature reduction key
17 Heating temperature increase key
18 LCD display

The RESET that restores all parameters to the factory settings occurs only by setting "parameter 08=04". When the reset is complete, this is displayed by all the symbols on the display turning on.

1.4 General LCD characteristics

For the technical specifications of the boiler consult the section "TECHNICAL SPECIFICATIONS" on page 20.

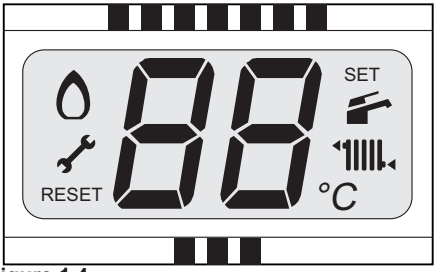


Figure 1.4

KEY

RESET	The symbol indicates that the boiler can be restarted by the user by pressing the reset button
	The symbol indicates that the fault requires the intervention of specialised technical support
	All symbols represented with lines around it indicate that the symbol is flashing

LCD SIGNALS

LCD	FUNCTION
Er 01 + RESET	Safety lockout due to failed ignition
Er 02 + RESET	Lockout due to safety thermostat operation
Er 03 + RESET	Generic lockout
Er 04 +	Pump circulation failure or insufficient system pressure
Er 05 +	Control anomaly: fan

LCD	FUNCTION
Er 06 +	NTC probe failure (heating)
Er 07 +	NTC probe failure (domestic hot water)
Er 08 +	NTC probe failure (external)
Er 09 +	Flue gas NTC probe failure (interruption)
Er 10 + RESET	Block due to tripping of the flue gas probe
	Parasite flame (flashing An + flashing error number)
Er 12 +	NTC probe failure (return)
Er 13 +	DT delivery-return >40K
Er 14 + RESET	Pump failure or primary temperature above 105 °C
Er 14 +	Temperature gradient circulation failure (>2K/s)
Er 19 +	Domestic hot water inlet probe failure (if present)
Er 69	Wiring error lockout
Li	Primary NTC limitation in d.h.w. mode
	Boiler Stand-By, hyphens are turned on in sequence to simulate running (antifreeze protection activated)
	Filling request: the boiler operates correctly and turns on the icons that are of use, also alternating the FL message every 1s.

BOILER DESCRIPTION

LCD	FUNCTION
	Insufficient pressure: The boiler is in lockout with an error and signals the lack of water with the usual code.
	Boiler waiting for a heat demand (only with connected remote)
	Boiler in summer (domestic hot water). The temperature of the primary circuit is displayed.
	Boiler in the winter (heating + domestic hot water) The temperature of the primary circuit is displayed.
	Boiler with d.h.w. power demand The d.h.w. temperature is displayed.
	Boiler with heating power demand.
	Burner ignition (discharge)
	Flame presence (Burner ignited)

LCD	FUNCTION
 	3 star preheating function. Indication not present. It is possible to check the status in the "INFO" section, value "**cF**" (the message "cF" alternates with the primary temperature value until the end of the function). Pressing the keys 13 and 14 for 5s switches the function status. The ON or OFF activation is confirmed by alternating the messages for 5s. The function remains active all days at all times (it is not possible to set time brackets unless remotely activated).
	Boiler in antifreeze phase (flashing bP + flashing temperature)
	Heating set (all other symbols are disabled)
	Connected remote (one flash every 4s)
	D.h.w. set (all other symbols are disabled)

USE

LCD	FUNCTION
	Pump active for the post-circulation phase (flashing Po + flashing temperature)
	Delay burner ignition due to system setting (flashing uu + flashing temperature)
	Maintenance overdue. Key flashing (without displaying other errors)
 	Boiler in chimney sweep function. The chimney sweep function is activated by setting the "parameter P09=01" and the following is displayed: LP = minimum dhw hP = minimum heating cP = maximum heating dP = maximum dhw. The transition occurs with keys 17 (increase) and 16 (decrease) dhw temperature. The message on the display alternates.

2 USER INSTRUCTIONS

2.1 Warnings

Check that the heating circuit is regularly filled with water even if the boiler should only be used for producing domestic hot water.

Otherwise, proceed with its filling, see section "Filling the heating circuit" on page 15.

All boilers have an "antifreeze" system that is activated if its temperature decreases below 5°C; therefore **do not turn off the boiler**.

If the boiler is not used during cold periods, with the resulting risk of freezing, proceed as described in section "Antifreeze protection" on page 15

2.2 Ignition

- The boiler cocks and those provided during installation must be open (Figure 2.1).

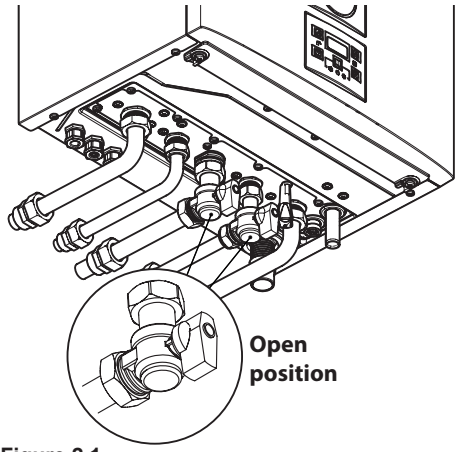


Figure 2.1

- Electrically power the boiler by turning on the installed bipolar switch. The LCD display shows the boiler status (last stored) Figure 2.2.

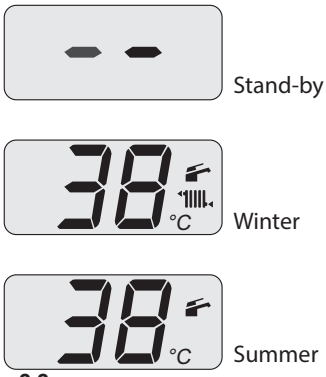


Figure 2.2

Heating/d.h.w. operation

- Press key 15 for 2 seconds until the symbols and are displayed Figure 2.3.

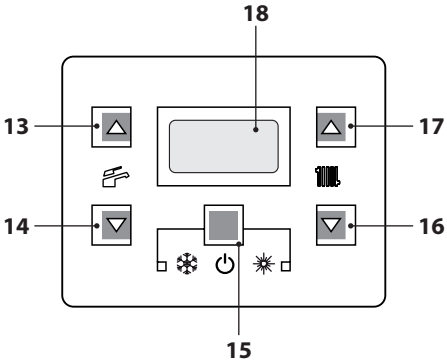


Figure 2.3

The LCD display shows the boiler temperature (primary circuit) and the symbols and ; the symbol °C flashes slowly Figure 2.4.

Figure 2.4

USE

Operation with only production of hot water

- Press key 15 for 2 seconds until the symbol appears on the display Figure 2.5.

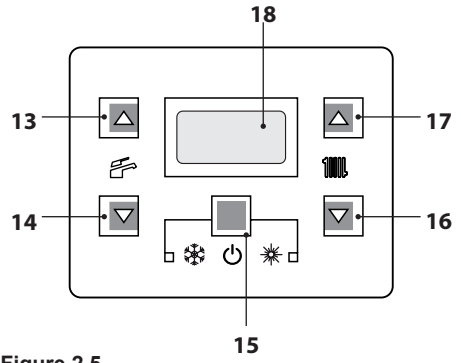


Figure 2.5

The LCD display shows the boiler temperature (primary circuit) and the symbol ; the symbol °C flashes slowly Figure 2.6.

Figure 2.6

2.3 Heating circuit temperature

The heating delivery temperature of the hot water can be adjusted using keys 16 (decrease) and 17 (increase) (Figure 2.5) between a minimum of approx. 25°C and a maximum of approx. 80°C. The first time one of those keys is pressed, the "set" value is displayed. The second time it is pressed makes it possible to modify it.

Data shown on the LCD display:

- The "set" value of the heating delivery temperature of the hot water and the symbol will flash. The background of the display will be illuminated (Figure 2.7).

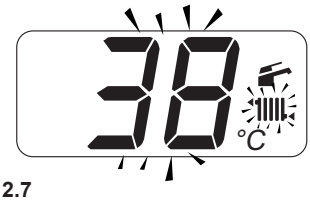


Figure 2.7

Adjustment of the heating temperature based on the external temperature (without external probe)

Adjust the temperature of the heating delivery hot water as follows:

- between 25 and 35 with an external temperature between 5 and 15°C;
- between 35 and 60 with an external temperature between -5 and +5°C;
- between 60 and 80 with an external temperature below -5°C.

Your qualified installer may suggest more suitable adjustments for your system.

It is possible to verify that the set temperature has been reached when the symbol is not visible on the LCD display.

Heating power demand.

When the boiler has a heating power demand, the display will show the symbol followed by an increase in the temperature of the heating delivery water temperature. The symbol will flash (Figure 2.8).

Figure 2.8

Adjusting the heating temperature with an installed external probe

When the optional external probe is installed,

your boiler will automatically adjust the temperature of the heating system's delivery water temperature in relation to the external temperature.
In this case, the boiler must be set by a qualified installer (see "Setting the K coefficient of the external probe" on page 44).
If the ambient temperature is not comfortable, you can increase or decrease the heating system delivery temperature by ± 15°C with the keys 16 (decrease) and 17 (increase) (Figure 2.5).

2.4 Domestic hot water temperature

The domestic hot water temperature can be adjusted using keys 13 (decrease) and 14 (increase) (Figure 2.5) between a minimum of approx. 35°C and a maximum of approx. 60°C.
The first time one of those keys is pressed, the "set" value is displayed. The second time it is pressed makes it possible to modify it.

Data shown on the LCD display:

- The "set" value of the domestic hot water the symbol will flash. The background of the display will be illuminated (Figure 2.7).

Figure 2.9

Regulation

Adjust the temperature of the domestic hot water to a value that suits your needs.
Limit the need to mix hot water with cold water. In this way you will appreciate the characteristics of automatic regulation.
If the water is particularly hard, we recommend regulating the boiler temperature to below 50°C.
In these cases, we recommend installing a water softener in the d.h.w. system.
If the maximum flow rate of the domestic hot water is too high so that a sufficient temperature cannot be reached, request an Authorised Support Technician to install a flow rate limiter.

Domestic hot water demand

When the boiler has a domestic hot water demand, the display will show the symbol followed by an increase in the temperature of the domestic hot water. The symbol will flash (Figure 2.10).

Figure 2.10

2.5 3 star preheating function

This function reduces consumption of the domestic water supply at the time of withdrawal, preparing the boiler temperature at the requested temperature.
To activate the 3 star preheating function press keys 13 and 14 at the same time (Figure 2.13) until "**cF**" appears on the display, which alternates with "**on**".

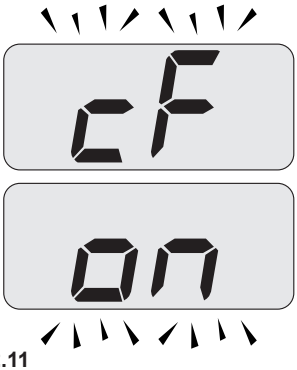


Figure 2.11

NOTE: Should the power to the boiler fail, wait at least one minute before reactivating the function upon reactivation.

To deactivate the 3 star preheating function press keys 13 and 14 at the same time (Figure 2.13) until "**cF**" appears on the display, which alternates with "**oF**".

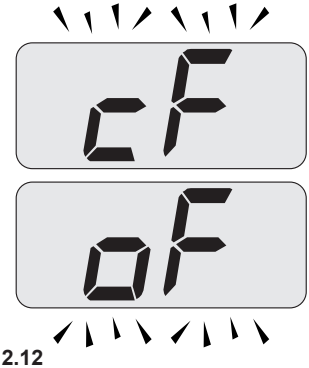


Figure 2.12

2.6 Shut-off

Press key 15 (Figure 2.13) for 2 seconds until the symbol ⬬ ⬬ appears on the display (Figure 2.14).

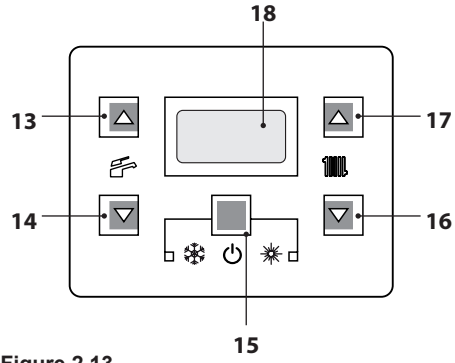


Figure 2.13

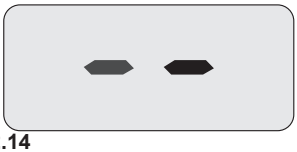


Figure 2.14

If the boiler will be inactive for a long period of time:

- Disconnect the boiler from the electric power supply;
- Close the boiler cocks Figure 2.15;

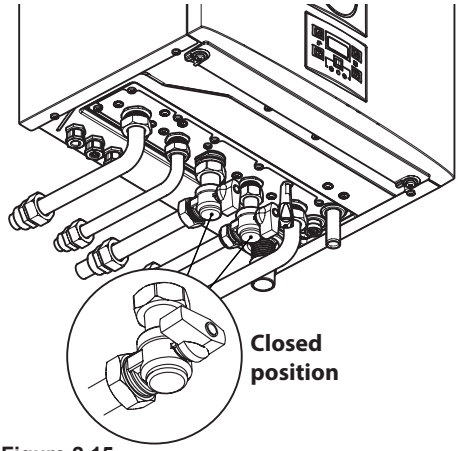


Figure 2.15

- If necessary, empty the hydraulic circuits, see section "Emptying the d.h.w. circuit" on page 62 and section "Emptying the heating circuit" on page 62.

3 USEFUL TIPS

3.1 Filling the heating circuit

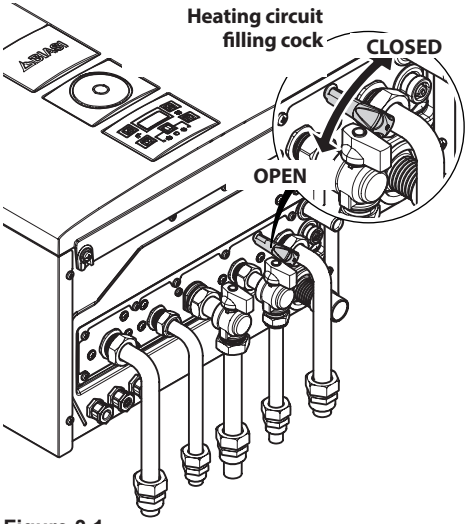


Figure 3.1

Press keys 15 and 17 at the same time to access the "INFO" menu (information). The index value "**d0**" will be shown on the display, alternating with the pressure value "**13**" (1.3 bar). The number indicating the pressure is displayed without a decimal point, and the letter indicates the unit of measure (bar) (Figure 3.2).

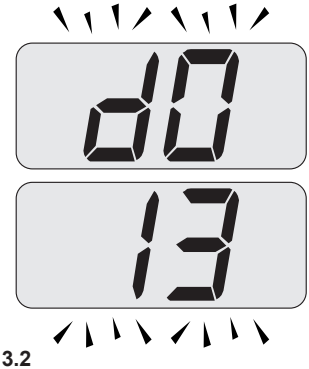


Figure 3.2

Open the filling cock in Figure 3.1 located under the boiler and check at the same time the heating circuit pressure on the display. The pressure must be between 1 bar and 1.5 bar (e.g. 1.3 bar in Figure 3.2).

When the operation is complete, reclose the filling cock and bleed any air from the radiators.

3.2 Heating

For rational and economic service, have an ambient thermostat installed.

Never turn off the radiator in the room where the ambient thermostat is installed.

If a radiator (or convector) does not heat, check if there is air in the system and that its cock is open.

If the ambient temperature is too high, do not adjust the radiator cocks but decrease the heating temperature regulation using the ambient thermostat or the heating regulation keys 16 and 17 (Figure 3.3).

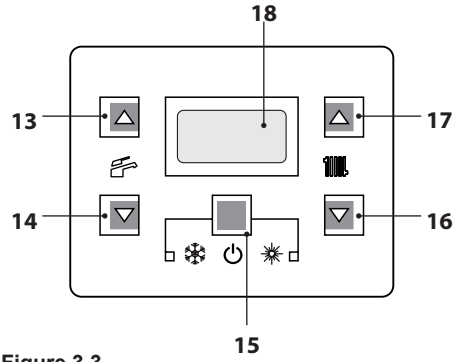


Figure 3.3

3.3 Antifreeze protection

The antifreeze system, and any additional protections, protect the boiler from possible damage due to freezing.

This system does not guarantee protection for the entire hydraulic system.

If the external temperature could reach values below 0°C it is recommended to leave the entire system on, setting the ambient thermostat to a low temperature.
The antifreeze function is active even if the boiler is in stand-by (Figure 3.4).

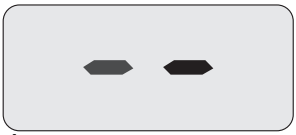


Figure 3.4

If the boiler is turned off, have a qualified technician empty the boiler (heating and d.h.w. circuit) and empty the heating system and the d.h.w. system.

3.4 Periodic maintenance

For efficient and regular boiler operation, it is recommended to have it serviced and cleaned at least once a year by technician from an Authorised Service Centre.
During this check, the most important boiler components will be inspected and cleaned. This check may be performed within the scope of a maintenance contract.

3.5 External cleaning

Before performing any cleaning operation, disconnect the boiler from the electric mains supply.

To clean, use a cloth soaked in soap and water.
Do not use: Solvents, flammable substances, abrasive substances.

3.6 Operating anomalies

If the boiler is not operating and a code appears on the LCD display that alternates with the letter **Er** and the message **reset** (see "General LCD characteristics" on page 8), the boiler is in lockout. The background of the display will flash (Figure 3.5).

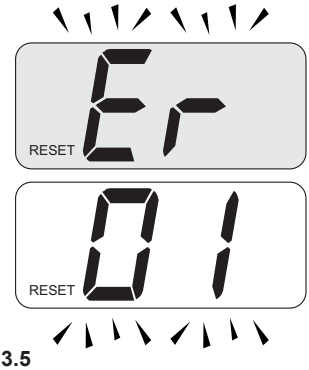


Figure 3.5

To restore operation, press the reset key 15 (Figure 3.3) on the boiler control panel.

Frequent safety lockouts should be reported to the Authorised Service Centre.

<u>Other possible anomalies shown on the LCD display</u>

If the LCD display shows a code that alternates between the letters **Er** and the symbol the boiler has an anomaly that cannot be reset.
The background of the display will flash (Figure 3.6).

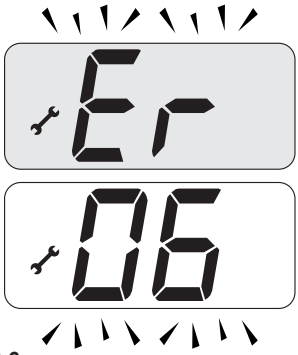


Figure 3.6

Another possible signal occurs when the d.h.w. exchanger is not able to exchange all the power delivered by the boiler.
E.g. D.h.w. exchanger blocked by lime scale. This occurs only when the boiler has a demand for domestic hot water.

The LCD display shows code **01** that alternates with the letter **Li**. The background of the display will flash (Figure 3.7).

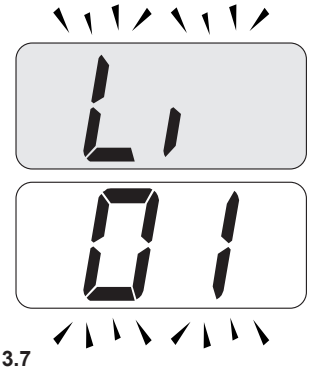


Figure 3.7

To reset proper boiler operation contact a technician at the Authorised Service Centre

Air bubble noises

Check the pressure of the heating circuit and fill it if necessary, see section "Filling the heating circuit" on page 15.

Low system pressure

Add more water to the heating system.
For the operation, refer to section "Filling the heating circuit" on page 15.
The user is responsible for periodically checking the pressure of the heating system.
If water must be added too often, have the technical support centre check if there are leaks in the heating system or the boiler itself.

Water leaks from the safety valve

Check if the filling cock is well closed (see "Filling the heating circuit" on page 15).
Check from the "INFO" (information) menu that the heating circuit pressure is not close to 3 bar. In this case it is recommended to drain a part of the water from the system through the air relief valves in the radiators in order to reduce the pressure to a regular value.

In the case of malfunctions other than those described above, shut down the boiler as described in see "Shut-off" on page 14 and contact the technician from the Authorised Service Centre.

3.7 Displays in INFO mode

The INFO mode makes it possible to view boiler operation status information. In the case of a boiler malfunction, it is recommended to provide this information to the Service Centre to understand the causes.

To access the INFO mode, press keys 15 and 17 (Figure 3.8) at the same time until the displays shows the letter **d** that alternates with a code (Figure 3.9).

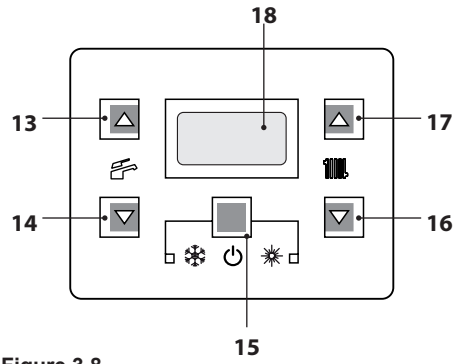


Figure 3.8

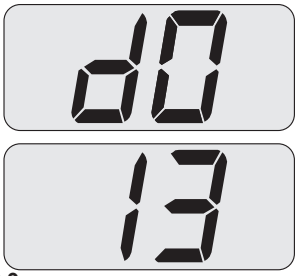


Figure 3.9

To scroll the values press the keys 16 (decrease) and 17 (increase). To exit the INFO mode, press down keys 15 and 17 (Figure 3.8) at the same time.

The table summarises the possible values visible in INFO mode.

Value visualised	Table of contents
Primary circuit pressure	d0 + value
External temperature	d1 + value
K curve value configured on site	d2 + value
Offset climatic curve value	d3 + value
Calculated heating set point (with climatic curve or set configured)	d4 + value
Temperature NTC delivery	d5 + value
Temperature NTC return	d6 + value
Domestic set	c0 + value
Temp. Dhw output	d7 + value
Dhw capacity	c2 + value
Flue gas temperature (if foreseen)	d8 + value
Fan speed (if foreseen)	d9 + value
Flue gas pressure (not present)	dA + - -
Ionization value	db + value
Number of months to maintenance	c3 + value
3 star status (ON=01, OFF=00)	cF + value
Code HW - BIC	dc + value
Revision HW - BIC	dd + value
Code FW - BIC	dE + value
Revision FW - BIC	dF + value

3.8 Remote anomaly code

If the optional remote is connected to the boiler, a code can be shown on the central part of the display that indicates a boiler anomaly.
The current anomaly is indicated by a numeric code followed by the letter **E**.
The table summarises the possible codes that can be displayed on the remote.

Anomaly	Code
Ignition failed lockout	01E
Safety thermostat trip lockout	02E
Generic lockout	03E
No water in the heating or circulation circuit	04E
Fan control anomaly	05E
Heating NTC probe anomaly	06E
D.h.w. NTC probe anomaly	07E
External NTC probe anomaly	08E
Flue gas NTC probe anomaly (interruption)	09E
Lockout due to tripping of the discharge probe	10E
Parasite flame	11E
No circulation or pump failure or activation due to primary temperature limit	14E

3.9 Flue gas probe

The flue gas probe 19 indicated in Figure 3.10 is a safety device.

It is triggered when the flue gas temperature exceeds 110°C, activating the boiler safety lockout, shutting it off.

To reset normal boiler operation simply press the key 15 (Figure 3.8).

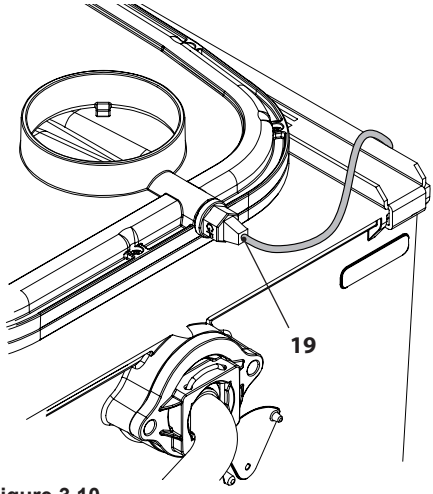


Figure 3.10

4 TECHNICAL SPECIFICATIONS

4.1 Assembly view

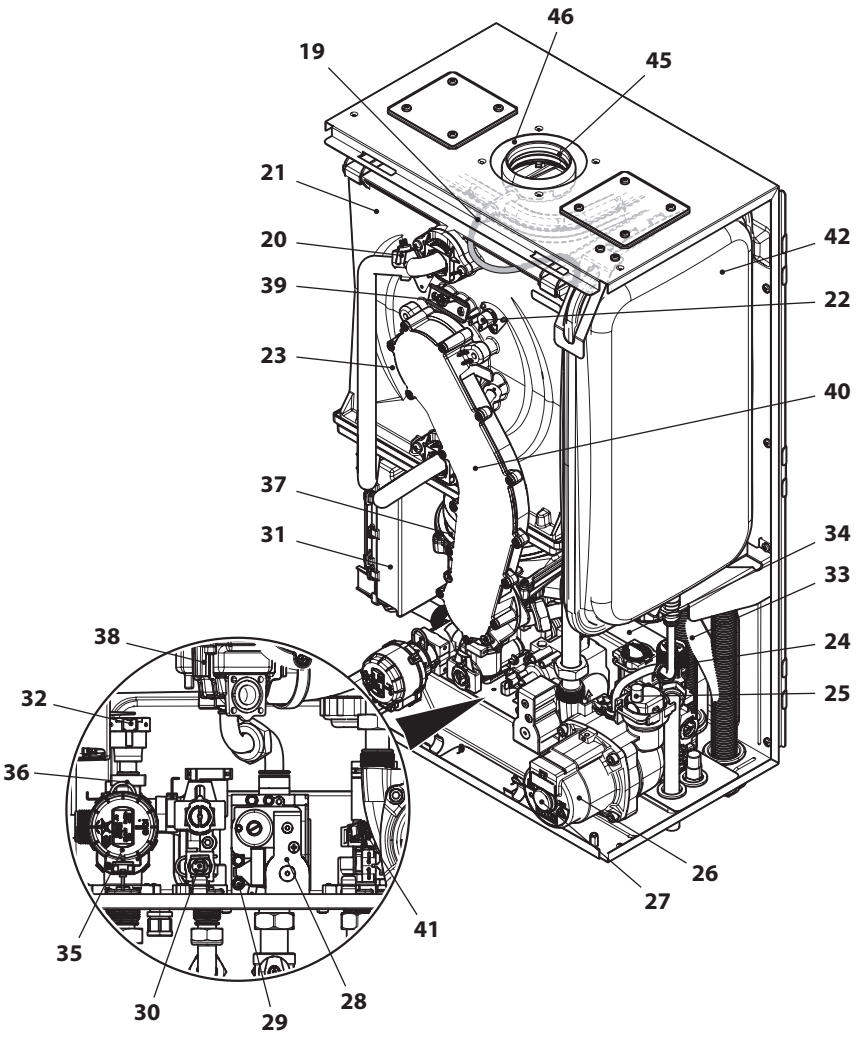


Figure 4.1

4.2 Schematic diagram

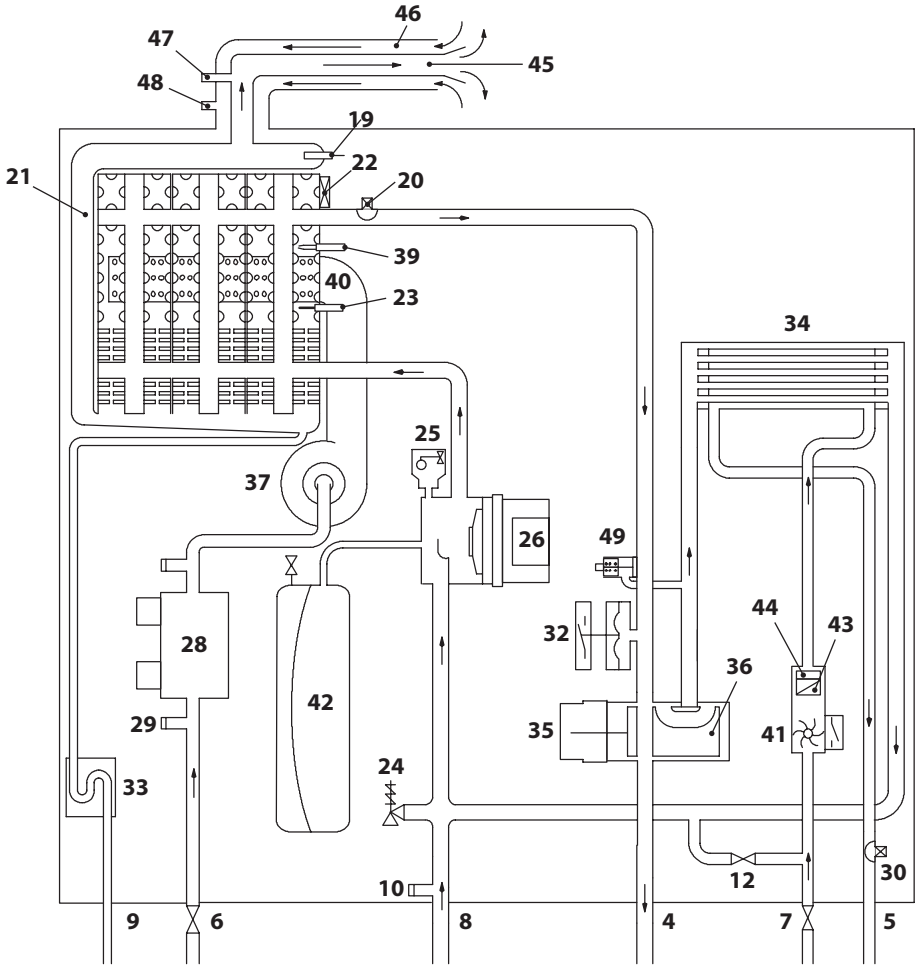


Figure 4.2

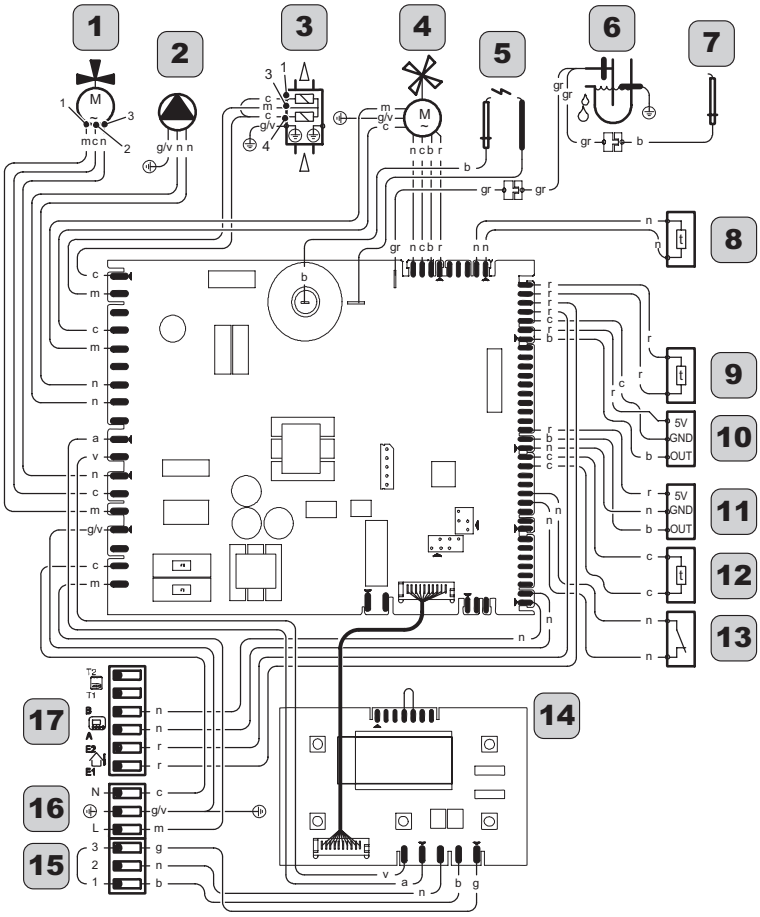
4 Heating delivery pipe
5 Domestic hot water outlet pipe
6 Gas cock
7 Domestic hot water inlet cock
8 Heating return pipe
9 Condensate discharge pipe
10 Heating circuit emptying cock
12 Heating circuit filling cock
19 Flue gas NTC probe
20 Heating NTC probe
21 Primary condensate exchanger
22 Safety thermostat
23 Flame detection electrode
24 3 bar safety valve
25 Automatic bleed valve
26 Pump

27 Pump bleed cap
28 Gas valve
29 Gas valve inlet tapping point
30 D.h.w. NTC probe
31 Board containing:
External, remote temperature probe and boiler probe terminal board
Power supply and ambient thermostat terminal board
32 Heating transducer
33 Condensate discharge siphon
34 D.h.w. exchanger
35 Three-way valve
36 Three-way valve plug
37 Fan
38 Aerotech (air/gas diaphragm)
39 Ignition electrodes
40 Burner
41 D.h.w. flowmeter
42 Expansion tank
43 Domestic hot water filter
44 D.h.w. flow rate limiter
45 Flue gas exhaust duct
46 Air suction duct
47 Flue gas suction inlet
48 Air suction inlet
49 Integrated by-pass

* To access the *Data plate*, remove the front panel from the body as described in the *Maintenance* chapter.

4.3 Wiring diagram

1	Three-way valve	**7**	Detection electrode	**13**	Safety thermostat
2	Pump	**8**	Flue gas probe	**14**	LCD display card
3	Gas valve	**9**	D.h.w. NTC	**15**	Ambient thermostat terminal board
4	Fan	**10**	D.h.w. flowmeter	**16**	Electric power supply terminal board
5	Ignition electrodes	**11**	Heating transducer	**17**	External probe - remote terminal board
6	Condensate collection siphon	**12**	Heating NTC		



a	orange	**g**	yellow	**n**	black	**g/v**	yellow/green
b	white	**gr**	grey	**r**	red		
c	blue	**m**	brown	**v**	purple		

Figure 4.3

4.4 Technical data M160.2025 SM/M

(nom.Q.) Nominal heat input in heating mode (Hi)	kW	20,0
	kcal/h	17197
(nom.Q.) Nominal heat input in d.h.w. mode (Hi)	kW	25,0
	kcal/h	21496
(nom.Q.) Minimum heat input (Hi)	kW	5,9
	kcal/h	5073
* Max. heat input in heating mode 60°/80°C	kW	19,5
	kcal/h	16767
* Max. heat input in d.h.w. mode 60°/80°C	kW	24,3
	kcal/h	20894
* Min. heat input 60°/80°C	kW	5,7
	kcal/h	4901
** Max. heat input in heating mode 30°/50°C	kW	20,7
	kcal/h	17799
** Max. heat input in d.h.w. mode 30°/50°C	kW	25,9
	kcal/h	22270
** Min. heat input 30°/50°C	kW	6,3
	kcal/h	5417

Data in heating mode		
NOx class		5
Weighted NOx	mg/ kWh	35
	ppm	20
Weighted CO EN483 (0% O2)	ppm	160,0
CO at nom. Q. (0% O2) ***	ppm	160,0
CO at nom. Q. (0% O2) ***	ppm	15,0
CO2 at nom. Q. with G20	%	8,9 - 9,7
CO2 at min. Q. with G20	%	8,2 - 9,0
CO2 at nom. Q. with G30	%	11,9 - 12,6
CO2 at min. Q. with G30	%	11,2 - 12,2
CO2 at nom. Q. with G31	%	9,9 - 10,8
CO2 at min. Q. with G31	%	9,2 - 10,2
** Condensate quantity at nom.Q. 30°/50°C	l/h	3,2
** Condensate quantity at min.Q. 30°/50°C	l/h	0,9
Condensate pH	l/h	4,0

Data in d.h.w. mode		
CO2 at nom. Q. with G20	%	9,0 - 9,8
CO2 at min. Q. with G20	%	8,2 - 9,0
CO2 at nom. Q. with G30	%	11,9 - 12,6
CO2 at min. Q. with G30	%	11,2 - 12,2
CO2 at nom. Q. with G31	%	10,0 - 10,9
CO2 at min. Q. with G31	%	9,2 - 10,2

* With return water temperature that does not permit condensation

** With return water temperature that does permits condensation

*** With coax. flue gas discharge 60/100 0.9 m and METHANE gas G20

Measured efficiency in heating mode		
* Nominal efficiency 60°/80°C	%	97,8
* Min. efficiency 60°/80 C	%	97,8
** Nominal efficiency 30°/50°C	%	102,9
** Min. efficiency 30°/50°C	%	106,9
* Efficiency At 30 % of load	%	101,1
** Efficiency At 30 % of load	%	108,0
Heat loss at the chimney with burner operating	Pf (%)	1,8
Heat loss at the chimney with burner off ΔT 50°C	Pfbs (%)	0,2
Heat loss towards the environment through the casing with the burner operating	Pd (%)	0,4
Energy efficiency		* * * *

TECHNICAL SPECIFICATIONS

Gas supply pressures			
Gas		Pa	mbar
Methane G20	**Nom.**	2000	20
	Min.	1700	17
	Max.	2500	25
Butane G30	**Nom.**	3000	30
	Min.	2000	20
	Max.	3500	35
Propane G31	**Nom.**	3000	30
	Min.	2000	20
	Max.	3500	35

Gas rate maximum - central heating		
Methane G20	m^3/h	2,12
Butane G30	kg/h	1,58
Propane G31	kg/h	1,55
Gas rate maximum - domestic hot water		
Methane G20	m^3/h	2,65
Butane G30	kg/h	1,97
Propane G31	kg/h	1,94
Gas rate minimum - ch dhw		
Methane G20	m^3/h	0,62
Butane G30	kg/h	0,47
Propane G31	kg/h	0,46

Gas diaphragm		Ø mm /100
Methane G20		620
Butane G30		450
Propane G31		450
Air/gas mixer diaphragm		
Methane G20	Fuchsia	Fucsia
Butane G30	Fuchsia	Fucsia
Propane G31	Fuchsia	Fucsia

Heating		
Adjustable temperature *	°C	25 - 80
Max. operating temp.	°C	90
Maximum pressure	kPa	300
	bar	3,0
Minimum pressure	kPa	30
	bar	0,3
Available pressure difference (at 1000 l/h)	kPa	36
	bar	0,36

** At minimum useful power*

Domestic hot water		
Temp. Minimum-Maximum	°C	35 – 60
Maximum pressure	kPa	1000
	bar	10
Minimum pressure	kPa	30
	bar	0,3
Maximum flow rate		
(ΔT=25 K)	l/min	14,3
(ΔT=35 K)	l/min	10,2
Minimum flow rate	l/min	2,5
Specific d.h.w. flow rate (ΔT=30 K) *	l/min	11,9

** Reference standard EN 625*

Chimney design #		
Max. flue gas temperature at 60°/80°C	°C	75
Max. flue gas temperature at 30°/50°C	°C	50
Max. flue gas mass flow rate	kg/s	0,0089
Min. flue gas mass flow rate	kg/s	0,0028
Max. air mass flow rate	kg/s	0,0085
Min. air mass flow rate	kg/s	0,0027

 # Values refer to tests with 80 mm 1 + 1 twin pipe discharge Methane gas G20 and heat input in d.h.w. mode

TECHNICAL SPECIFICATIONS

Electrical data		
Voltage	V	230
Frequency	Hz	50
Electric power	W	140
Degree of protection		IPX5D

Other characteristics		
Height	mm	700
Width	mm	400
Depth	mm	290
Weight	kg	34,7
Min. ambient temperature	°C	-10
Max. ambient temperature	°C	60

Flue gas discharges		
Boiler type		
B23P C13 C33 C43 C53 C63 C83		
Coaxial air/flue gas duct Ø	mm	60/100
Twin pipe air/flue gas duct Ø	mm	80/80
Coaxial air/flue gas duct to roof Ø	mm	80/125

G20 Hi. 34.02 MJ/m3 (15°C, 1013.25 mbar)

G30 Hi. 45.65 MJ/kg (15°C, 1013.25 mbar)

G31 Hi. 46.34 MJ/kg (15°C, 1013.25 mbar)

1 mbar corresponds to approx. 10 mm H20

4.5 Technical data M160.3035 SM/M

(nom.Q.) Nominal heat input in heating mode (Hi)	kW	30,0
	kcal/h	25795
(nom.Q.) Nominal heat input in d.h.w. mode (Hi)	kW	34,9
	kcal/h	30009
(nom.Q.) Minimum heat input (Hi)	kW	7,4
	kcal/h	6363
* Max. heat input in heating mode 60°/80°C	kW	29,2
	kcal/h	25107
* Max. heat input in d.h.w. mode 60°/80°C	kW	34,1
	kcal/h	29321
* Min. heat input 60°/80°C	kW	7,2
	kcal/h	6191
** Max. heat input in heating mode 30°/50°C	kW	30,7
	kcal/h	26397
** Max. heat input in d.h.w. mode 30°/50°C	kW	35,7
	kcal/h	30696
** Min. heat input 30°/50°C	kW	7,9
	kcal/h	6793

Data in heating mode		
NOx class		5
Weighted NOx	mg/kWh	47
	ppm	27
Weighted CO EN483 (0% O2)	ppm	160,0
CO at nom. Q. (0% O2) ***	ppm	153,0
CO at nom. Q. (0% O2) ***	ppm	15,0
CO2 at nom. Q. with G20	%	8,9 - 9,7
CO2 at min. Q. with G20	%	8,2 - 9,0
CO2 at nom. Q. with G30	%	11,9 - 12,6
CO2 at min. Q. with G30	%	11,2 - 12,2
CO2 at nom. Q. with G31	%	9,9 - 10,8
CO2 at min. Q. with G31	%	9,2 - 10,2
** Condensate quantity at nom.Q. 30°/50°C	l/h	4,8
** Condensate quantity at min.Q. 30°/50°C	l/h	1,2
Condensate pH	l/h	4,0

Data in d.h.w. mode		
CO2 at nom. Q. with G20	%	9,0 - 9,8
CO2 at min. Q. with G20	%	8,2 - 9,0
CO2 at nom. Q. with G30	%	11,9 - 12,6
CO2 at min. Q. with G30	%	11,2 - 12,2
CO2 at nom. Q. with G31	%	10,0 - 10,9
CO2 at min. Q. with G31	%	9,2 - 10,2

* With return water temperature that does not permit condensation

** With return water temperature that does permits condensation

*** With coax. flue gas discharge 60/100 0.9 m and METHANE gas G20

Measured efficiency in heating mode		
* Nominal efficiency 60°/80°C	%	97,8
* Min. efficiency 60°/80 C	%	98,1
** Nominal efficiency 30°/50°C	%	102,2
** Min. efficiency 30°/50°C	%	106,3
* Efficiency At 30 % of load	%	101,3
** Efficiency At 30 % of load	%	108,0
Heat loss at the chimney with burner operating	Pf (%)	1,8
Heat loss at the chimney with burner off ΔT 50°C	Pfbs (%)	0,2
Heat loss towards the environment through the casing with the burner operating	Pd (%)	0,4
Energy efficiency		****

TECHNICAL SPECIFICATIONS

Gas supply pressures			
Gas		Pa	mbar
Methane G20	**Nom.**	2000	20
	Min.	1700	17
	Max.	2500	25
Butane G30	**Nom.**	3000	30
	Min.	2000	20
	Max.	3500	35
Propane G31	**Nom.**	3000	30
	Min.	2000	20
	Max.	3500	35

Gas rate maximum - central heating		
Methane G20	m^3/h	3,17
Butane G30	kg/h	2,37
Propane G31	kg/h	2,33
Gas rate maximum - domestic hot water		
Methane G20	m^3/h	3,69
Butane G30	kg/h	2,76
Propane G31	kg/h	2,71
Gas rate minimum - ch dhw		
Methane G20	m^3/h	0,76
Butane G30	kg/h	0,58
Propane G31	kg/h	0,56

Gas diaphragm		Ø mm /100
Methane G20		770
Butane G30		520
Propane G31		520
Air/gas mixer diaphragm		
Methane G20	Blue	Blu
Butane G30	Blue	Blu
Propane G31	Blue	Blu

Heating		
Adjustable temperature *	°C	25 - 80
Max. operating temp.	°C	90
Maximum pressure	kPa	300
	bar	3,0
Minimum pressure	kPa	30
	bar	0,3
Available pressure difference (at 1000 l/h)	kPa	39
	bar	0,39

** At minimum useful power*

Domestic hot water		
Temp. Minimum-Maximum	°C	35 - 60
Maximum pressure	kPa	1000
	bar	10
Minimum pressure	kPa	30
	bar	0,3
Maximum flow rate		
(ΔT=25 K)	l/min	20,0
(ΔT=35 K)	l/min	14,3
Minimum flow rate	l/min	2,5
Specific d.h.w. flow rate (ΔT=30 K) *	l/min	16,7

** Reference standard EN 625*

Chimney design #		
Max. flue gas temperature at 60°/80°C	°C	80
Max. flue gas temperature at 30°/50°C	°C	55
Max. flue gas mass flow rate	kg/s	0,0153
Min. flue gas mass flow rate	kg/s	0,0035
Max. air mass flow rate	kg/s	0,0146
Min. air mass flow rate	kg/s	0,0033

 # Values refer to tests with 80 mm 1 + 1 twin pipe discharge Methane gas G20 and heat input in d.h.w. mode

TECHNICAL SPECIFICATIONS

Electrical data		
Voltage	V	230
Frequency	Hz	50
Electric power	W	140
Degree of protection		IPX5D

Other characteristics		
Height	mm	700
Width	mm	400
Depth	mm	290
Weight	kg	37,7
Min. ambient temperature	°C	-10
Max. ambient temperature	°C	60

Flue gas discharges		
Boiler type		
B23P C13 C33 C43 C53 C63 C83		
Coaxial air/flue gas duct Ø	mm	60/100
Twin pipe air/flue gas duct Ø	mm	80/80
Coaxial air/flue gas duct to roof Ø	mm	80/125

G20 Hi. 34.02 MJ/m3 (15°C, 1013.25 mbar)

G30 Hi. 45.65 MJ/kg (15°C, 1013.25 mbar)

G31 Hi. 46.34 MJ/kg (15°C, 1013.25 mbar)

1 mbar corresponds to approx. 10 mm H20

4.6 Hydraulic characteristic

The hydraulic characteristic represents the pressure (head) available in the heating system based on the flow rate.

Model **M160.2025 SM/M**

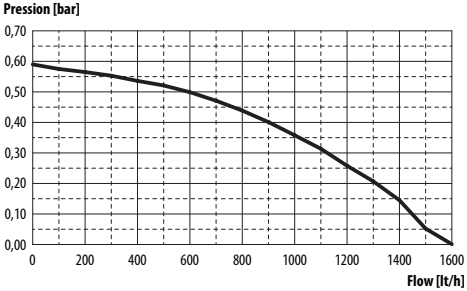


Figure 4.4

Model **M160.3035 SM/M**

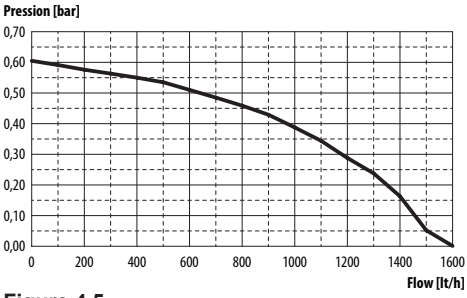


Figure 4.5

The loss of load for the boiler has already been subtracted.

Flow rate with the thermostatic cocks closed

The boiler has an automatic by-pass, which protects the primary condensate exchanger.
If the circulation of water in the heating system decreases too much or totally stops due to the closure of thermostatic valves or circuit cocks, the by-pass guarantees a minimum circulation of water inside the primary condensate exchanger.
The by-pass is calibrated for a differential pressure of approx. 0.3 - -0.4 bar.

4.7 Expansion tank

The difference in height between the safety valve and the highest point in the system can be max. 10 metres.
If differences are greater, increase the preload pressure of the expansion tank and the cold system by 0.1 bar for each 1 metre increase.

Total capacity	l	7.0
Pre-load pressure	kPa	100
	bar	1.0
Useful capacity	l	3.5
Maximum system content *	l	109

Figure 4.6

* In conditions of:

- Average max. temperature of the system 85°C
- Initial temperature when filling the system 10°C.

For systems with contents that exceed the maximum system content (indicated in the table), a supplementary expansion tank must be installed.

5 INSTALLATION

5.1 Warnings

The unit must discharge the combustion products directly outside or in a suitable exhaust flue designed for that purpose and in compliance with current national and local standards.

The unit is not suitable for receiving condensate from the combustion product evacuation system.

Before installation, it is **mandatory** to thoroughly wash all of the system pipes with non-aggressive chemical products. The purpose of this procedure is to remove any residuals or impurities that could jeopardise proper boiler operation.
After washing, the system must be treated.
The conventional warranty does not cover any problems resulting from the failure to follow these instructions.

Check:

- That the boiler is suitable for the type of gas distributed (check adhesive label). If it is necessary to adapt the boiler to a different type of gas, see section "GAS CONVERSION" on page 58.
- That the characteristics of the electric, water and gas supply networks comply with those of the plate.

The combustion products may only be discharged using the flue gas exhaust kits provided by the manufacturer, as they are an integral part of the boiler.
For LPG gas (Butane G30 - Propane G31), the installation must comply with the requirements of the distributing companies and comply with the requirements of current technical standards and laws.
The safety valve must be connected to a suitable discharge duct to avoid flooding if it is activated.
The condensate discharge siphon must be connected to the residential condensate discharge duct and it must be possible to inspect it and it must be implemented in a manner to avoid the condensate from freezing (UNI 11071 and correlated standards).

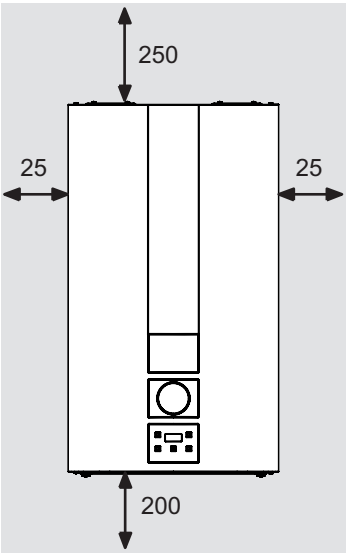
The electric installation must comply with technical standards, in particular:

- It is **mandatory** to connect the boiler to an effective grounding system with a specific terminal.
- A single pole switch must be installed near the boiler to permit complete disconnection in the conditions of over-voltage category III. For the electrical connections refer to section "Electrical connection" on page 40.
- **The electric conductors for connecting the remote control to the boiler** must go through different channels than those for the mains voltage (230 V), as they are supplied with low safety voltage.

5.2 Precautions for installation

Follow these directions for installation:

- Mount the boiler on a resistant wall
- Respect the measurements of the flue gas evacuation duct (provided in section "Flue gas discharge dimensions and lengths" on page 35) and the correct systems for installing the duct shown in the instruction sheet provided together with the flue gas evacuation pipe kit.
- Leave the minimum distances indicated in Figure 5.1 around the unit.



All measurements are in mm.

Figure 5.1

- Leave 5 cm of free space in front of the boiler if it is inserted in a cabinet, protection or niche.
- In the case of an old heating system, before installing the boiler, carefully clean it in order to remove any sludgy deposits that have formed over time.
- It is recommended to install a purification filter in the system or use a product that conditions the circulating water.
  This latter solution, in particular, not only cleans the system but also provides anticorrosion protection by forming a protective film on the metal surfaces and neutralising the gases in the water.

Filling the heating system:

- If the boiler is installed in rooms where the ambient temperature could go below 0°C, it is recommended to take the proper precautions in order to prevent damaging the boiler.
- Do not add antifreeze or anticorrosion products to the heating water in the wrong concentrations or with chemical/physical characteristics that are incompatible with the hydraulic boiler components.

The manufacturer does not assume any liability for this type of damage.

Inform the user about the antifreeze function of the boiler and any chemical products added to the heating system.

5.3 Installing the boiler support

The boiler is provided with a support for assembly.
A paper template (provided) is available that contains all the measures and information for correctly installing the support.
The hydraulic and gas system must terminate with female fittings, 3/4" for the gas fitting and and for the heating delivery and return and 1/2" for the d.h.w. inlet and outlet, or with welded copper pipes - ø 18 mm and ø 14 mm.
For measurements and useful data see section "Dimensions" on page 33, "Fittings" page 33, "Flue gas discharge dimensions and lengths" page 35.

5.4 Dimensions

The boiler complies with the following dimensions:

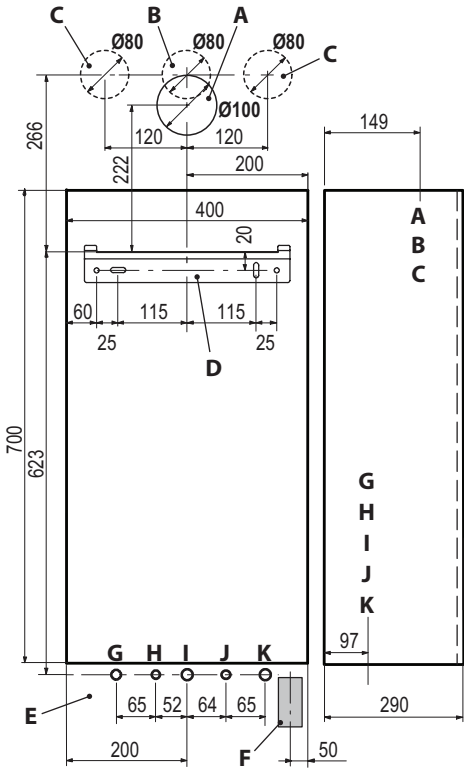


Figure 5.2

- **A** flue gas exhaust/air suction (coaxial ø 100/60)
- **B** flue gas exhaust (ø 80 twin pipe)
- **C** air exhaust (ø 80 twin pipe)
- **D** boiler mounting support
- **E** area for positioning the electric connection channels
- **F** area for positioning the condensate discharge pipe
- **G** MR - Heating delivery
- **H** US - D.h.w. outlet
- **I** Gas
- **J** ES - D.h.w. inlet
- **K** RR - Heating return

5.5 Fittings

The boiler uses the following fittings:

	Cock	Pipe ø
MR		ø 16/18
US		ø 12/14
Gas	G 3/4 MF	ø 16/18
ES	G 1/2 MF	ø 12/14
RR		ø 16/18
G1/2F 3 bar safety valve fitting		

Condensate discharge to be implemented with pipe min. ø 30 mm

5.6 Boiler assembly

- Remove the protective caps from the boiler pipes.
- Hook the boiler on the support.
- Screw the cocks on the boiler.

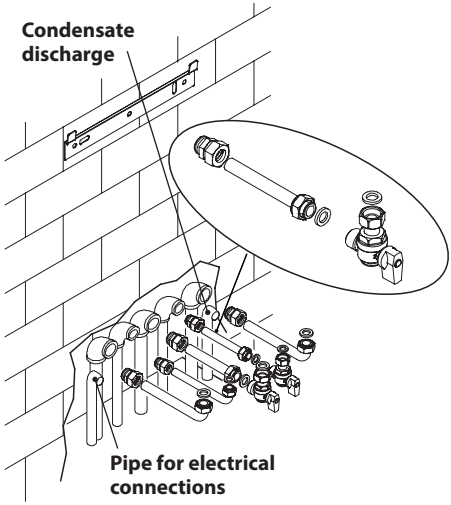


Figure 5.3

- Tighten the quick fittings on the hydraulic system.
- If the hydraulic heating system is higher than the boiler surface, cocks should be installed

in order to disconnect the system for maintenance purposes.
- Insert the flared stub pipe in the quick fittings.
- Block the pipes by placing 1/2" and 3/4" gaskets between the boiler fittings.
- Carry out a leakage test for the gas supply system.
- Connect the safety valve discharge 11 (Figure 5.4) to a discharge funnel.

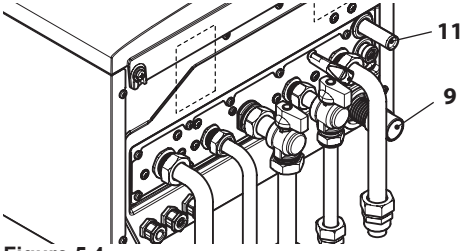


Figure 5.4

- Insert the flexible condensate discharge pipe 9 (Figure 5.4) inside the residential condensate discharge duct or the discharge funnel of the safety valve if the discharge is suitable for receiving acid condensate.

5.7 Controlling the flue gas exhaust duct

Consult the sheet provided together with the preselected kit for the correct installation of the flue gas duct.

The horizontal sections of the flue gas pipes must have a min. slope of 1.5 degrees (25 mm per meter), therefore the terminal must be higher than the boiler side entrance.

Only the coaxial pipe with the terminal must be horizontal as the discharge pipe has already been implemented with the correct slope.

CORRECT implementation of a wall-mounted concentric discharge system

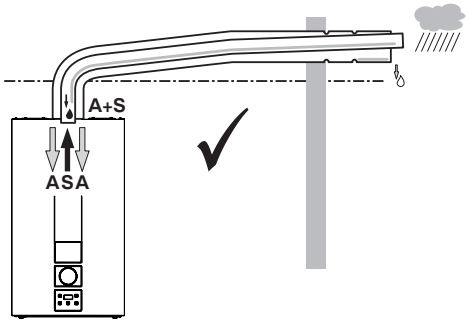


Figure 5.5

A = air suction

S = flue gas discharge

CORRECT implementation of twin flue gas discharge/air suction systems

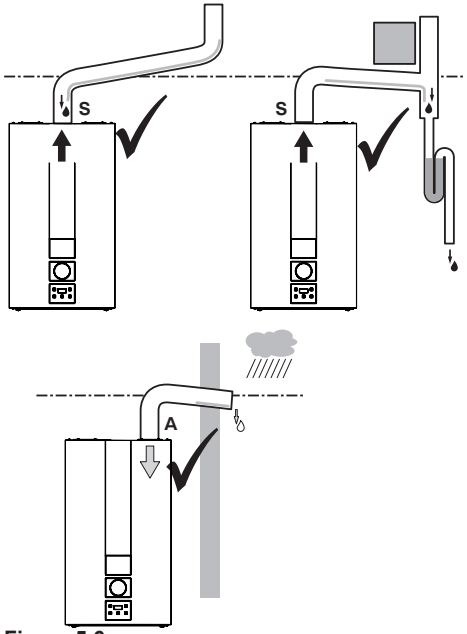


Figure 5.6

A = air suction

S = flue gas discharge

INCORRECT implementation of twin flue gas discharge/air suction systems

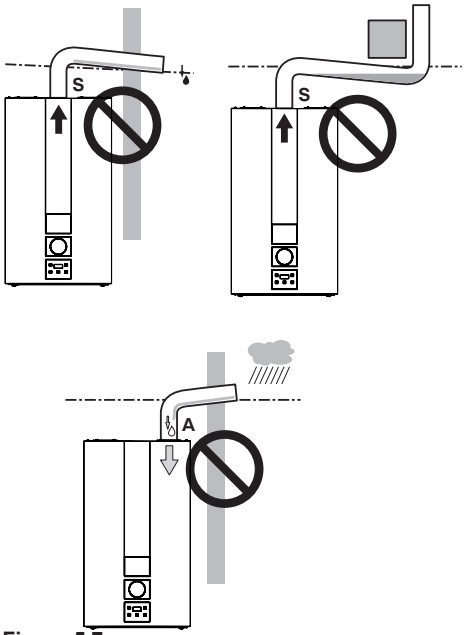


Figure 5.7

A = air suction

S = flue gas discharge

5.8 Flue gas discharge dimensions and lengths

The flue gas discharge/air suction can be implemented with the following methods:

C_{13} C_{33} C_{43} C_{53} C_{63} C_{83} B_{23P}

Consult the sheet provided together with the selected, separately packaged kit.

The horizontal sections of the flue gas pipes must have a slope of approx. 1.5 degrees (25 mm per metre).

The terminal must be higher than the boiler side entrance.

Only the coaxial pipe with the terminal must be horizontal as the discharge pipe has already been implemented with the correct slope.

The following kits are available for connection to the boiler:

Wall-mounting flue gas discharge kit (Figure 5.8 A)

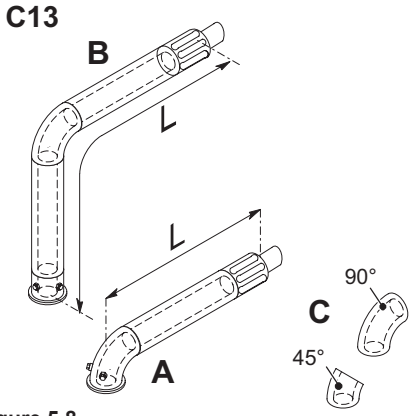


Figure 5.8

Coaxial duct Ø 60/100 mm with a nominal length of 915 mm.

This kit makes it possible to discharge the flue gas in the wall behind or to the side of the boiler.

The minimum length of the duct must not be less than 0.5 m, whereas the maximum length with an auxiliary extension must not exceed 10 m for model M160.2025 SM/M and 6 m for model M160.3035 SM/M.

Vertical flue gas discharge kit with 90° elbow (Figure 5.8 B)

Coaxial duct Ø 60/100 mm.

This kit makes it possible to raise the discharge axis of the boiler by 635 mm.

The minimum length must not be less than 0.5 m, whereas the maximum length with an auxiliary extension must not exceed 10 m for model M160.2025 SM/M and 6 m for model

M160.3035 SM/M horizontally and in case the terminal must always discharge horizontally.

Supplementary 45° or 90° elbow (Figure 5.8 C)

Coaxial elbows Ø 60/100 mm.

When these elbows are used in the duct, they reduce the maximum length of the flue gas ducts for:

For a 45° elbow loss	0.5 m
For a 90° elbow loss	1 m

Twin pipe suction discharge duct kit Ø 80 mm (Figure 5.9) - (Figure 5.10) - (Figure 5.11)

This kit makes it possible to separate the flue gas discharge from the air suction. The terminals can be inserted in exhaust flues designed for this purpose, or discharge flue gas or intake air directly on the wall.

Note: When the boiler is combined with a twin flue gas discharge kit , a Ø 50 mm (Figure 5.9) diaphragm must be inserted between the boiler and the air suction stub pipe.

The diaphragm is included in the Ø 80 mm splitter flue gas kit .

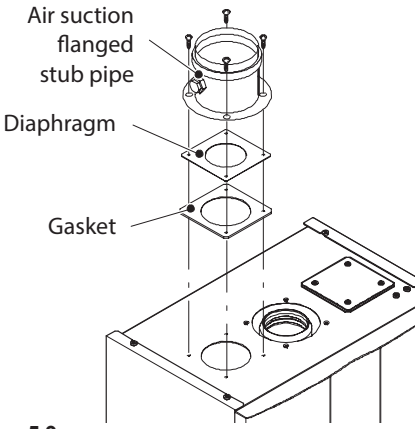


Figure 5.9

N.B.: The terminals of the air suction and flue gas exhaust pipes must not be positioned on opposite walls of the building (EN 483).

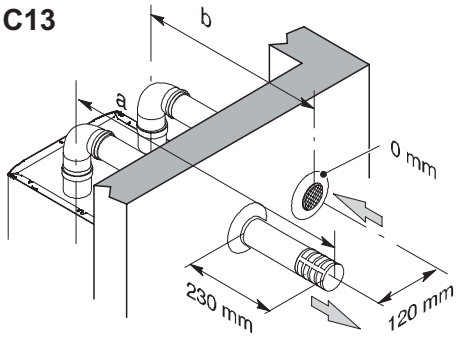


Figure 5.10

The minimum length of the pipes must not be less than 0.5 m, whereas the max. sum of sections **A + B** that can be implemented using extensions must not exceed 40 m for model M160.2025 SM/M and 25 m for model M160.3035 SM/M.

Also Ø 80 mm 90° and 45° elbows are available that reduce the total max length of the ducts:

For a 45° elbow loss	0.9 m
For a 90° elbow loss	1.65 m

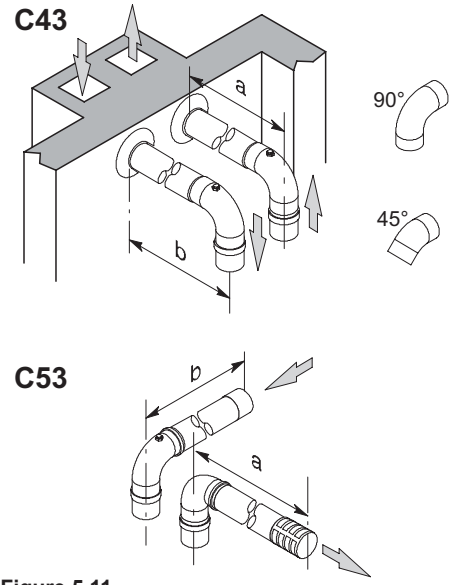


Figure 5.11

TYPE C_{63}

If using ducts and terminals from another manufacturer (type C_{63}), these must be approved and in the case of a flue gas duct, materials must be used that comply with the condensation products.

When dimensioning the ducts, account for the residual pressure difference at the fan:

Useful static pressure at nominal heat input	**25 kW**	120	Pa
	35 kW	100	Pa
Flue gas over-temperature	**25 kW**	-	°C
	35 kW	-	°C
Maximum recirculation of CO_2 in the suction duct	**25 kW**	-	%
	35 kW	-	%

TYPE C_{83} (Figure 5.12)

The boiler with the installation of this type of discharge must take the comburent air from the outside and discharge the flue gas in the individual or collective chimney designed for this purpose.

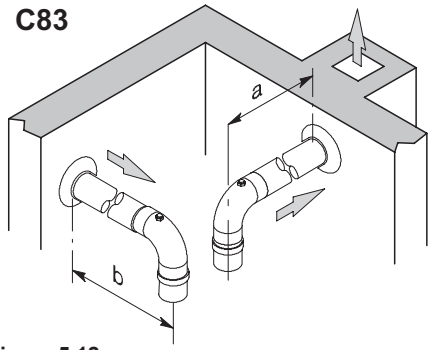


Figure 5.12

Roof-mounted flue gas discharge kit (Figure 5.13)

Coaxial duct Ø 80/125 mm with a nominal length of 0.96 m.

This kit makes it possible to discharge directly to the roof.

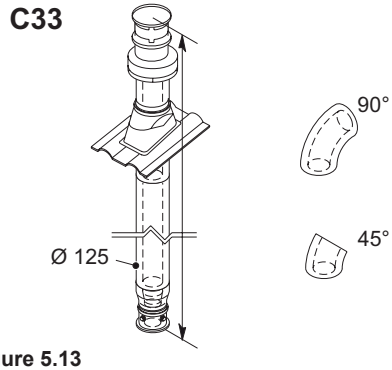


Figure 5.13

Extensions are available for reaching the maximum height.

Its max height with extensions is 10 m for model M160.2025 SM/M and 6 m for model M160.3035 SM/M. Coaxial Ø 80/125 mm 90° and 45° elbows are available that reduce the total max length of the ducts:

For a 45° elbow loss	0.5 m
For a 90° elbow loss	1 m

TYPE B_{23P} (Figure 5.14)

This type of flue gas discharge takes the comburent air necessary in the same room where the boiler is installed, the combustion product must be discharged outside and can be wall mounted or boiler mounted.

There must be a suitable air intake in the room where the boiler is installed for the supply of comburent air and for room ventilation.

For proper operation, the minimum air exchange necessary must be 2 m^3/h for each kW of heat input.

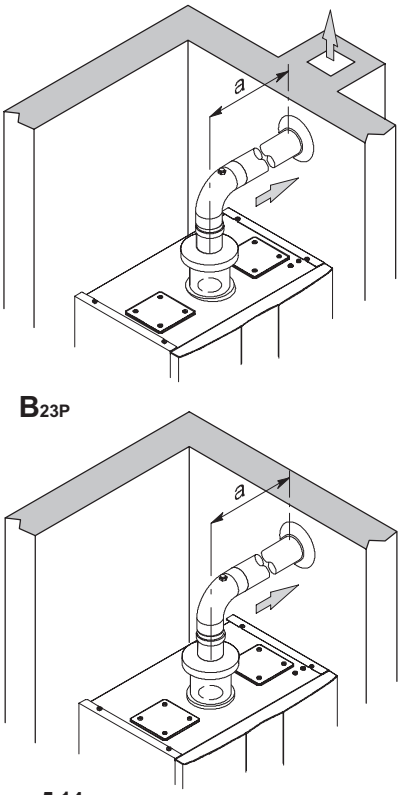


Figure 5.14

The minimum length of the pipes must not be less than 0.5 m, whereas the max. sum of sections **A + B** that can be implemented using extensions must not exceed 40 m for model M160.2025 SM/M and 25 m for model M160.3035 SM/M.

Also Ø 80 mm 90° and 45° elbows are available that reduce the total max length of the ducts:

For a 45° elbow loss	0.9 m
For a 90° elbow loss	1.65 m

Discharge kit for exteriors (Figure 5.15)

This kit makes it possible to discharge the flue gas directly to the exhaust flue (designed for this purpose) or outside, whereas it takes the comburent air directly from the room in which the boiler is installed.

Extensions are available for reaching the maximum permissible lengths.

The minimum length of the exhaust pipe must not be less than 0.5 m, whereas the max length that can be realised with extensions must not exceed 15 m.

Also Ø 80 mm 90° and 45° elbows are available that reduce the total max length of the ducts: see table above.

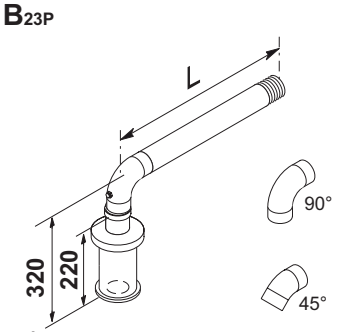


Figure 5.15

5.9 Positioning of the draft terminals

The draft terminals must:

- be positioned on the outer perimeter walls of the building or on the roof;
- comply with the minimum distances Figure 5.16 and any national or local laws.

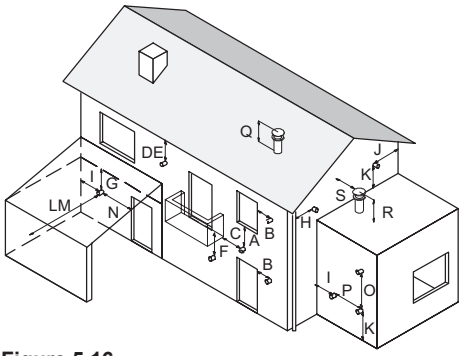


Figure 5.16

	Position of the terminal	mm
A	Under the window or other opening	600
B	Next to a window or door	400
B	Next to an air vent or ventilation opening	600
C	Side of a balcony	1 000
D	Under the gutter or discharge pipes	300
E	Under the eaves	300
F	Under balconies	300
G	Under the garage roof	**NO**
H	From pipes with vertical discharge	300
I	From inner corners	300
J	From external corners	300
K	From the ground or other walkable surfaces	2 200
L	From a front facing surface without openings	2 000
M	From a front facing opening	3 000
N	From an opening in the garage	**NO**
O	Between two vertical terminals in the same wall	1 500
P	Between two horizontal terminals in the same wall	1 000
Q	Above the pitch of a roof with a slope less than or equal to 30° *	350
Q	Above the pitch of a roof with a slope greater than 30° *	600
R	Above a flat roof *	300
S	From a wall *	600
S	From two walls at an angle *	1 000

* Roof mounted terminal

5.10 Electrical connection

- Unscrew the screws **L** and remove the front panel **M** by pulling it towards you and then pushing it upwards in order to free it from the upper seats Figure 5.17.

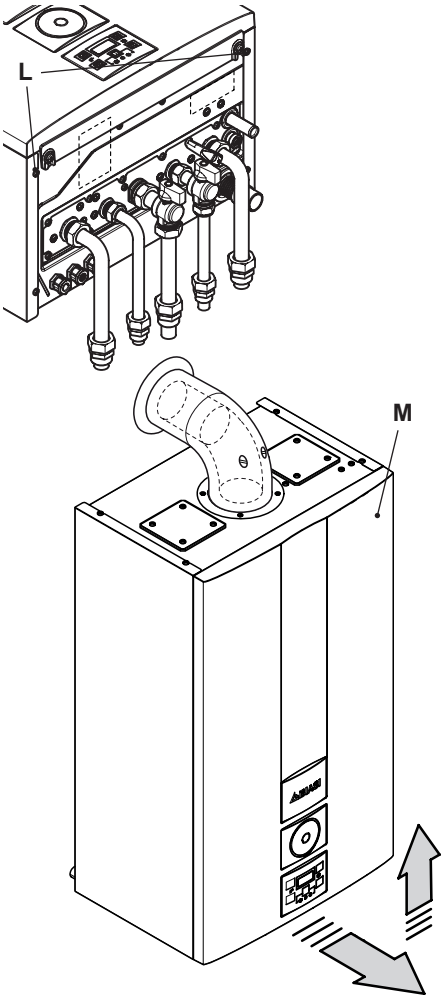


Figure 5.17

- Identify the terminal board cover **N** (Figure 5.18) and open it.

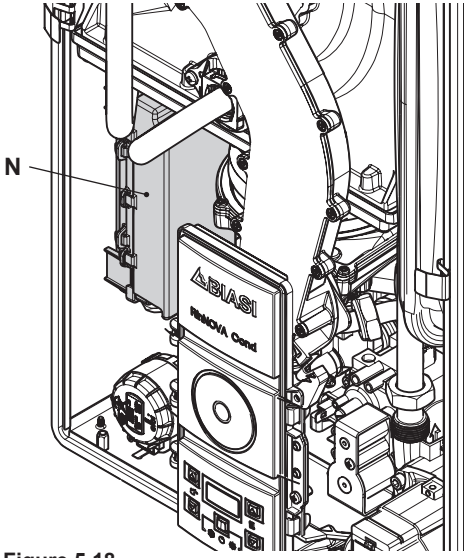


Figure 5.18

<u>Connecting to the electric power supply network</u>

- Connect the electric power supply cable originating from the single pole switch to the boiler electric power supply terminal board Figure 5.19 respecting the correspondence of the line (brown wire) and the neutral (blue wire).
- **Connect the ground wire (yellow/green) to an effective grounding system.**

The grounding wire must be longer than the electric power wires.

The electric power supply cable or wire for the unit must have a minimum section of 0.75 mm^2, be kept at a distance from hot or sharp parts and comply with current technical standards.

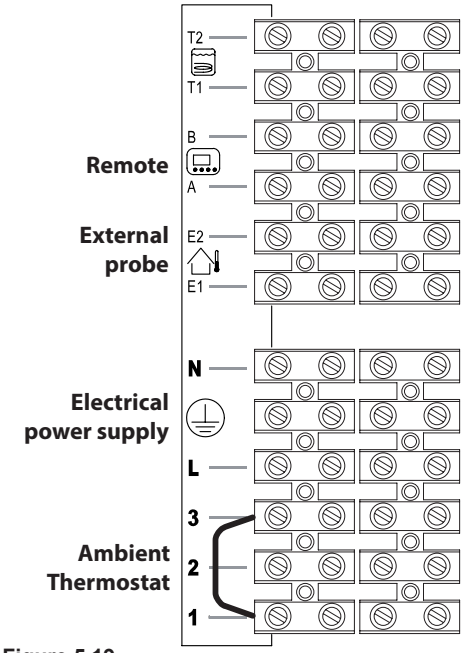


Figure 5.19

The path of the boiler and ambient thermostat power supply cable or wires must follow the path indicated in Figure 5.20.

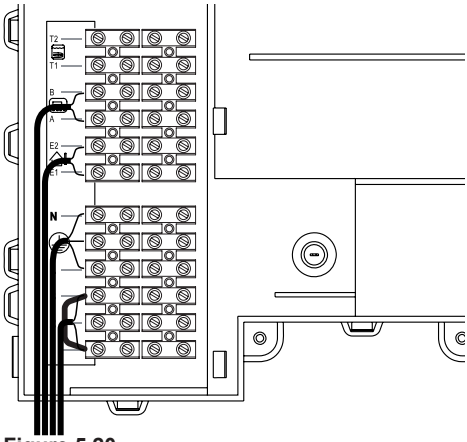


Figure 5.20

Make the boiler cables exit using specific cable glands O (Figure 5.21).

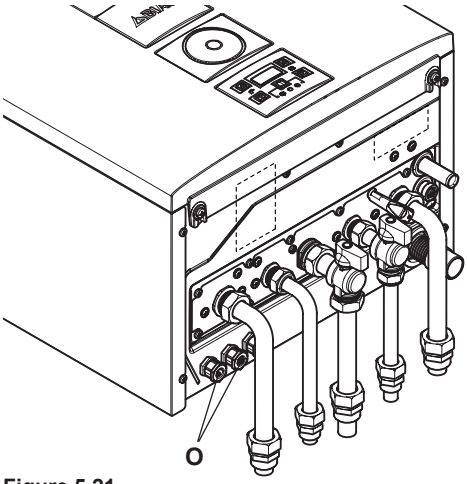


Figure 5.21

5.11 Connecting an ambient thermostat or zone valves

Use the terminals indicated in Figure 5.19 to connect the ambient thermostat.

When connecting any type of ambient thermostat, the electric jumper between "1 and 3" must be removed.

The electric wires for the ambient thermostat must be inserted between terminals "1 and 3" as shown in Figure 5.22.

Do not connect live cables on the "1 and 3" terminals.

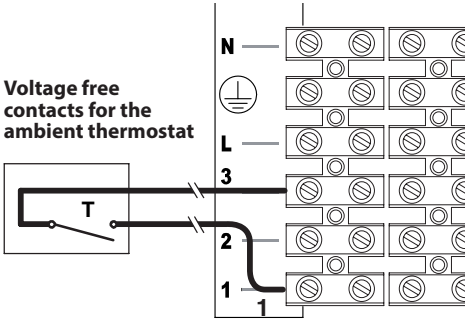


Figure 5.22

The thermostat must have insulation class II (⧈) or be correctly connected to the ground.

Connecting zone valves controlled by the ambient thermostat

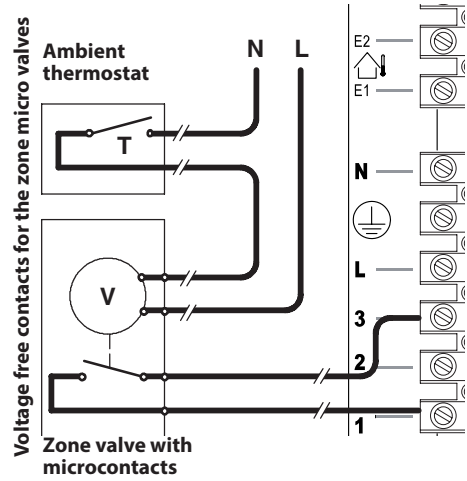


Figure 5.23

Use the ambient thermostat terminals indicated in Figure 5.19 and Figure 5.20 to connect the zone valves. The electric conductors of the zone valve micro contacts must be inserted in the "1 and 3" terminals of the ambient thermostat terminal board as shown in Figure 5.20.

The electric jumper between "1 and 3" must be removed.

Do not connect live cables on the "1 and 3" terminals.

The path of the boiler and ambient thermostat power supply cable or wires must follow the path indicated in Figure 5.20.
Make the boiler cables exit using specific cable glands O (Figure 5.21).

5.12 Installing the external temperature probe (optional)

The external probe must be installed on the external wall of the building avoiding:

- Direct radiation of the sun's rays.
- Humid walls or walls subject to the formation of mildew.
- Installation near fans, drain outlets or chimneys.

5.13 Electric connection between the boiler and the external probe

To connect the external probe to the boiler use electric cables with a section no less than 0.50 mm^2.

The electric conductors for connecting the external probe to the boiler must go through different channels than those for the mains voltage (230 V), as they are supplied with low safety voltage and their maximum length may not exceed 20 metres.

Use the terminals indicated in Figure 5.24 to connect the external probe.

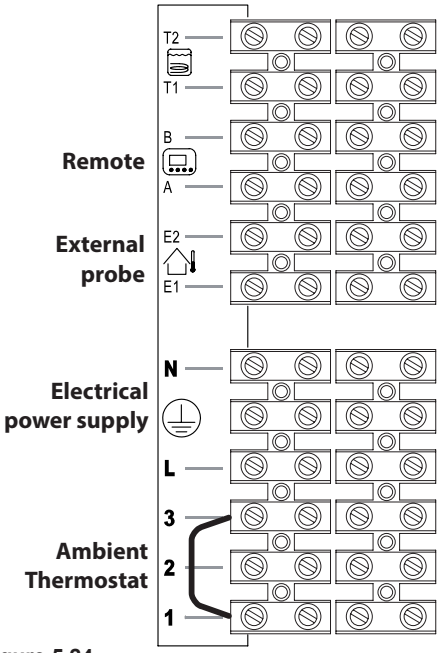


Figure 5.24

The path of the external probe connection wires must follow the path indicated in Figure 5.20.
Make the boiler cables exit using specific cable glands O (Figure 5.21).

5.14 Electrical connection of the remote (optional)

Use the terminals indicated in Figure 5.24 to connect the remote.

To connect the remote control to the boiler, refer also to the REMOTE CONTROL manual.

The electric jumper connected in the ambient thermostat terminal board between terminals "1 and 3" should not be removed Figure 5.24.

The path of the remote control cable must follow the path indicated in Figure 5.20.
Make the boiler cables exit using specific cable glands O (Figure 5.21).

5.15 Remote enabling of operation with the external probe

Functioning with the external probe in the boiler must be enabled if the remote control is used.
The programming of the REMOTE (if installed) is used to enable its operation.

- Press the button P for more than 3 seconds to enter INFO mode.

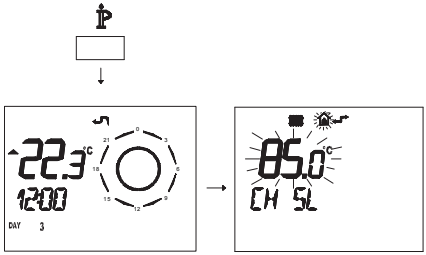


Figure 5.25

Press buttons DAY and ⏻ together to enter transparent programming (Figure 5.26)

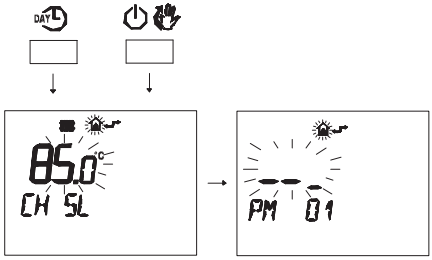


Figure 5.26

- Press buttons ▼ or ▲ to display the "**PM15**" program that enables the external probe (Figure 5.27).

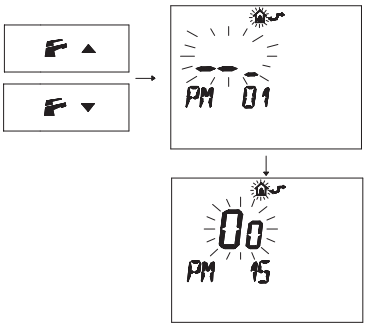


Figure 5.27

- Modify the programmed SET by pushing ▲ or ▼ until a **setting of 60** is displayed and wait for the programmed number to flash (Figure 5.28).

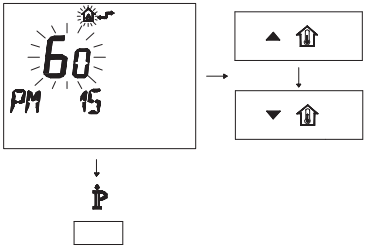


Figure 5.28

- Press ℙ to exit programming.

5.16 Setting the K coefficient of the external probe

The boiler is set with a K coefficient equal to zero for boiler functioning without the probe connected.

If the remote control **IS NOT CONNECTED** to the boiler (optional) refer to Figure 5.29.

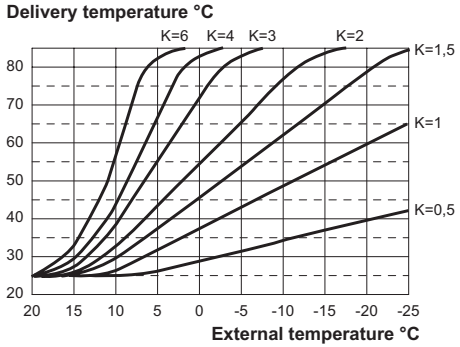


Figure 5.29

If the remote control **IS CONNECTED** to the boiler (optional) refer to Figure 5.30.
In this case, the K coefficient must be set remotely.

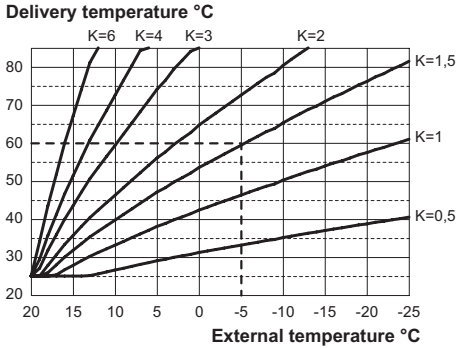


Figure 5.30

The K coefficient is a parameter that increases or decreases the boiler delivery temperature as the external temperature varies.
When installing the external probe, this parameter must be set based on the efficiency of the heating plant to optimise the delivery temperature (Figure 5.30).
E.g. To achieve a temperature delivered to the heating system of 60°C with an outdoor temperature of -5°C, set a K of 1.5 (dashed line in Figure 5.30).

Sequence for setting the K coefficient

- Enter "programming mode" by pressing keys 15 - 16 - 17 (Figure 5.31) together for 10 seconds until the LCD display indicates the letters **Pr** alternating with code **01**, indicating entry in "parameter 01" (Figure 5.32).

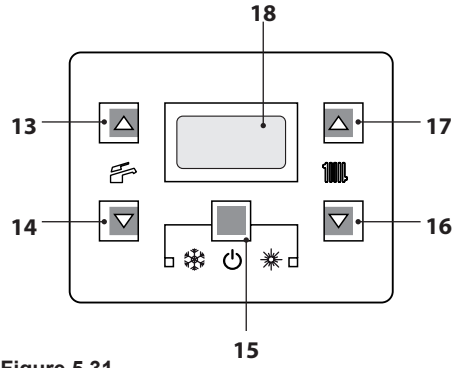


Figure 5.31

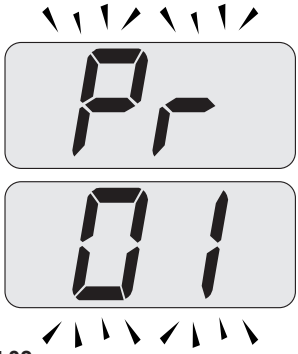


Figure 5.32

- Scroll the various parameters using keys 16 or 17 until the LCD display indicates the letters **Pr**, alternating with the code **15**, indicating entry in "parameter 15" (Figure 5.33).

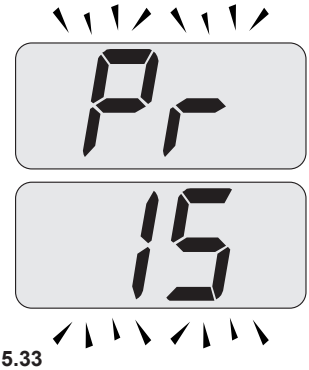


Figure 5.33

- Press keys 15 and 17 (Figure 5.31) at the same time until the LCD display indicates the value of parameter 15 (Figure 5.34).

Figure 5.34

- Using keys 16 or 17 makes it possible to change the value of parameter 15 from a minimum of **01** to a maximum of **60** based on the selected curve of the K coefficient in Figure 5.30 (the value read on the display corresponds to the decimal values of the K coefficients).
- By pressing key 15 (Figure 5.31) confirmation of the inserted value is obtained.
- By pressing keys 15 and 16 (Figure 5.31) together, you will exit without changing the value (return to parameter list Figure 5.33)
- Press keys 15 - 16 - 17 (Figure 5.31) together for 10 seconds to exit "programming mode".

At this point the plant delivery temperature will follow the trend in relation to the set K coefficient.

If the ambient temperature is not comfortable, you can increase or decrease the heating system delivery temperature by ± 15°C with the keys 16 (decrease) and 17 (increase) (Figure 5.31).

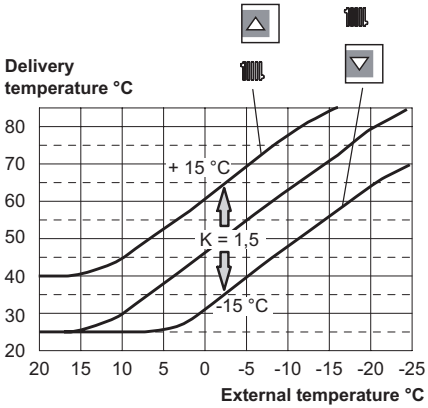


Figure 5.35

The temperature trend when changing the setting using keys 16 and 17 for a **K 1.5** is shown in Figure 5.35.

Sequence for setting the K coefficient with the remote connected

The setting of the K coefficient can be selected with the REMOTE programming.

- Electrically power the boiler by turning on the installed bipolar switch.
- Press the button ℙ for more than 3 seconds to enter INFO mode (Figure 5.36).

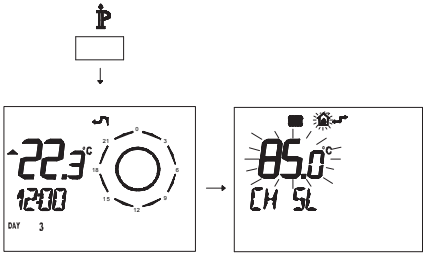


Figure 5.36

Press the button OK to display the **K REG** window (Figure 5.37).

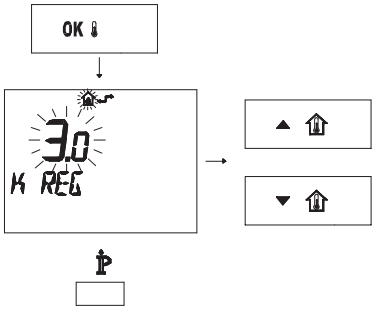


Figure 5.37

Use buttons ▲ and ▼ to change the value.
Press ℙ to exit the INFO mode (Figure 5.37).

5.17 Setting pump post-circulation

The pump, in heating function, is set for a post-circulation of about one minute at the end of each heat demand.
This time can be changed from a minimum of zero to a maximum of four minutes by programming it either from the control panel or remotely.

- Enter "programming mode" by pressing keys 15 - 16 - 17 (Figure 5.38) together for 10 seconds until the LCD display indicates the letters **Pr** alternating with code **01**, indicating entry in "parameter 01" (Figure 5.39).

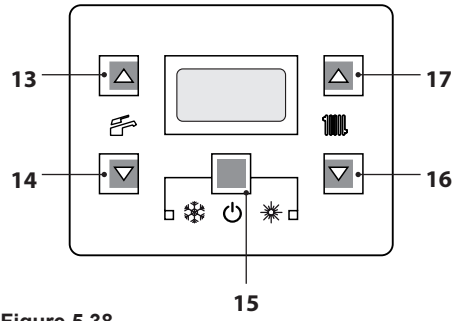


Figure 5.38

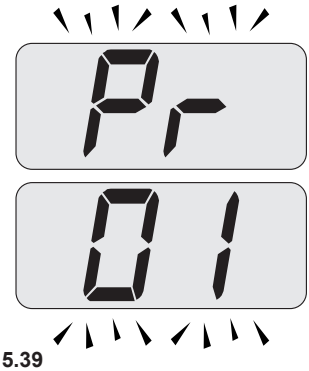


Figure 5.39

- Scroll the various parameters using keys 16 or 17 until the LCD display indicates the letters **Pr**, alternating with the code **11**, indicating entry in "parameter 11" (Figure 5.40).

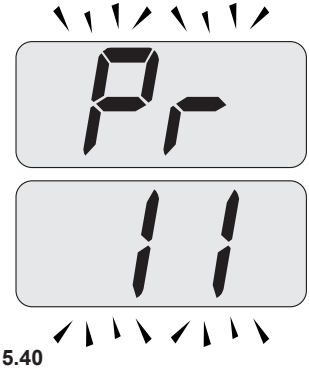


Figure 5.40

- Press keys 15 and 17 (Figure 5.38) at the same time until the LCD display indicates the value of parameter 11 (10=60 seconds) (Figure 5.41).

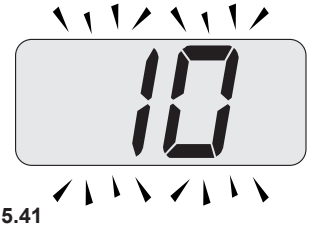


Figure 5.41

- Using keys 16 or 17 it is possible to modify the value of parameter 11 from **00=**0s to**99=**600s (each unit increase or decrease on the display corresponds to 6 seconds).
- By pressing key 15 (Figure 5.38) confirmation of the inserted value is obtained.
- By pressing keys 15 and 16 (Figure 5.38) together, you will exit without changing the value (return to parameter list Figure 5.40)
- Press keys 15 - 16 - 17 (Figure 5.38) together for 10 seconds to exit "programming mode".

REMOTE programming

- Press the button for more than 3 seconds to enter INFO mode (Figure 5.42).

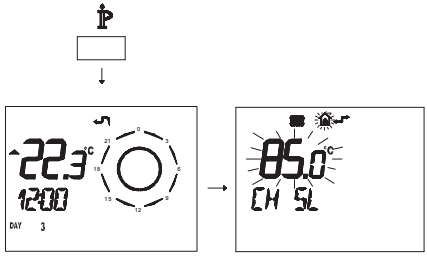


Figure 5.42

- Press buttons and together to enter transparent programming (Figure 5.43).

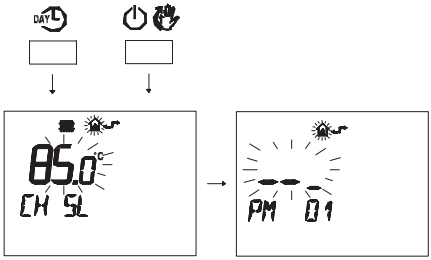


Figure 5.43

- Press buttons ▼ or ▲ to display the "**PM11**" program that enables pump post-circulation (Figure 5.44).

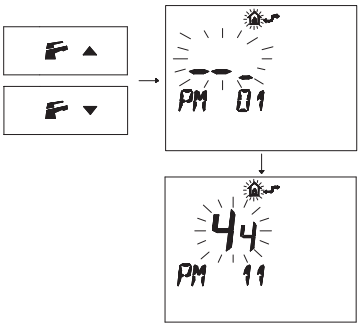


Figure 5.44

- To modify the programmed SET, press ▲ or ▼ and wait for the programmed number to start to flash (Figure 5.45). Each step increase or decreased corresponds to 1 second.

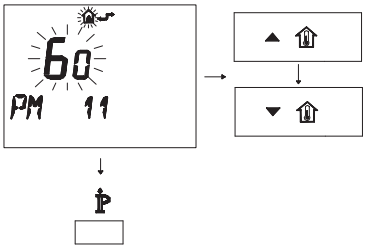


Figure 5.45

- Press P to exit programming.

5.18 Selecting reignition frequency

When the boiler functions in normal on/off heating mode, the minimum time between two ignitions is set to three minutes (re-ignition frequency).

This time can be changed from a minimum of zero to a maximum of eight and a half minutes by programming it either from the control panel or remotely.

- Enter "programming mode" by pressing keys 15 - 16 - 17 (Figure 5.46) together for 10 seconds until the LCD display indicates the letters **Pr** alternating with code **01**, indicating entry in "parameter 01" (Figure 5.47).

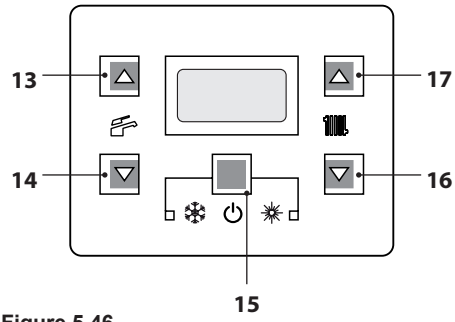


Figure 5.46

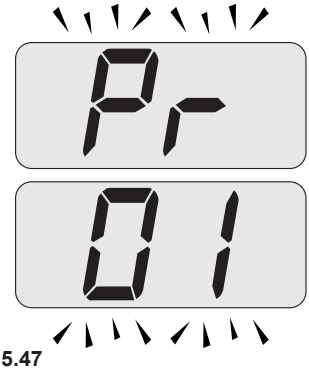


Figure 5.47

- Scroll the various parameters using keys 16 or 17 until the LCD display indicates the let-

ters **Pr**, alternating with the code **10**, indicating entry in "parameter 10" (Figure 5.48).

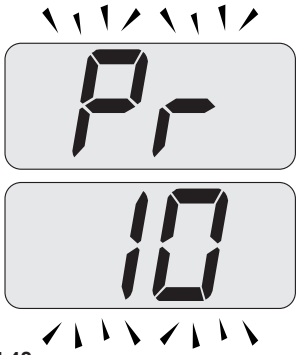


Figure 5.48

- Press keys 15 and 17 (Figure 5.46) at the same time until the LCD display indicates the value of parameter 10 (30=180 seconds) (Figure 5.49).

Figure 5.49

- Using keys 16 or 17 it is possible to modify the value of parameter 10 from **00=**0s to **99=**600s (each unit increase or decrease on the display corresponds to 6 seconds).
- By pressing key 15 (Figure 5.46) confirmation of the inserted value is obtained.
- By pressing keys 15 and 16 (Figure 5.46) together, you will exit without changing the value (return to parameter list Figure 5.48)
- Press keys 15 - 16 - 17 (Figure 5.46) together for 10 seconds to exit "programming mode".

REMOTE programming

Via REMOTE programming you can select a minimum time between two ignitions when the boiler is operating in normal on/off heating mode.

- Press the button for more than 3 seconds to enter *INFO* mode (Figure 5.50).

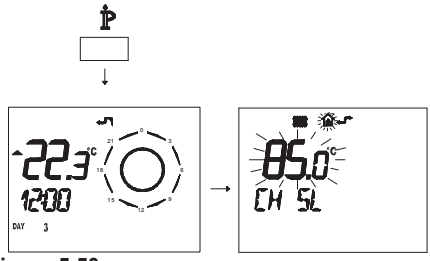


Figure 5.50

- Press buttons and together to enter transparent programming (Figure 5.51).

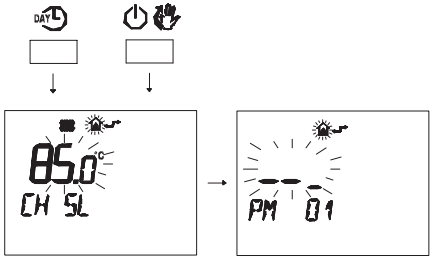


Figure 5.51

- Press buttons ▼ or ▲ to display the "**PM10**" program for selecting ignition frequency (Figure 5.52).

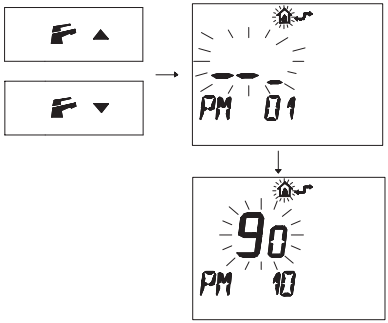


Figure 5.52

Figure 5.52 shows a programmed SET of **90**,

which corresponds to a re-ignition time of approx. 3 minutes.
The adjustment range is between 0 and 8 and a half minutes.
Each step increase or decreased corresponds to 2 second.

- To modify the programmed SET, press ▲ or ▼ and wait for the programmed number to start to flash (Figure 5.53).

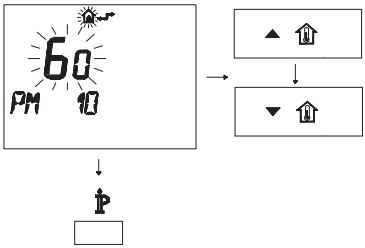


Figure 5.53

- Press ℙ to exit programming.

5.19 Examples of hydraulic plants with hydraulic separator (optional)

The hydraulic separator creates a reduced load loss zone that makes the primary circuit and secondary circuit hydraulically independent.
In this case, the flow rate that passes through the circuits depends exclusively on the characteristics of the flow rate of the pumps.
Therefore by using a hydraulic separator, the secondary circuit's flow rate is circulated only when the relative pump is on.
When the pump for the secondary circuit is off, there is no circulation in the corresponding circuit and therefore the flow rate pushed by the pump of the primary circuit is by-passed through the separator.
Therefore, with a hydraulic separator it is possible to have a production circuit with a constant flow rate and a distribution circuit with a variable flow rate.

Examples of hydraulic plants

High temperature zone + low temperature zone.

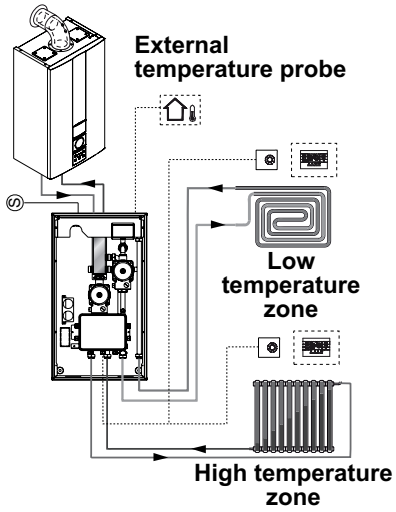


Figure 5.54

High temperature zone + 2 low temperature zones.

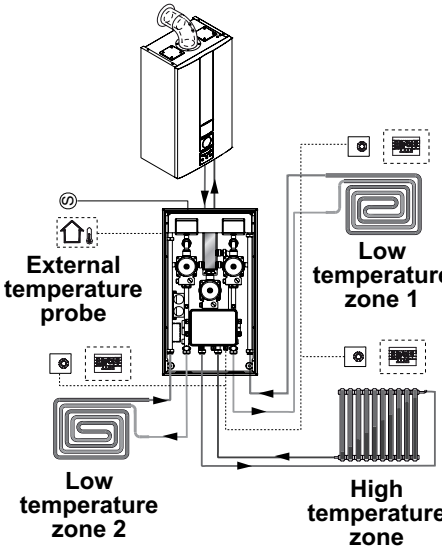


Figure 5.55

6 PREPARATION FOR SERVICE

6.1 Warnings

Before performing the operations described below, make sure that the installed bipolar switch is in the off position.

6.2 Sequence of the operations

Gas supply

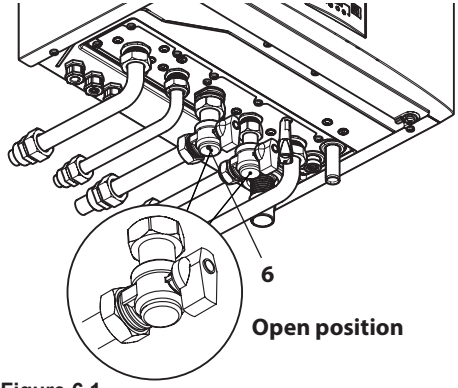


Figure 6.1

- Open the cock for the gas meter and for the boiler 6 in Figure 6.1.
- Check for leaks in the gas fitting using a soapy solution or an equivalent product.
- Reclose the gas cock 6 in Figure 6.2.

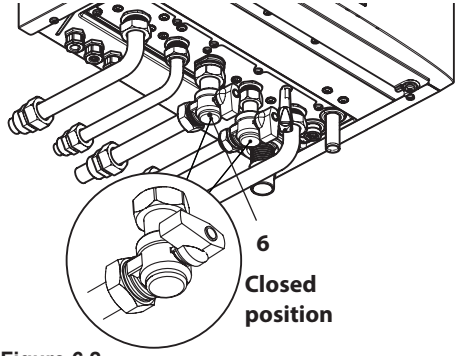


Figure 6.2

- Remove the front panel on the body, see section "Removing the body panels" on page 61.
- Open the installed water cocks.
- Open one or more hot water cocks to bleed the pipes.
- Raise the automatic bleed valve cap 25 in Figure 6.3.

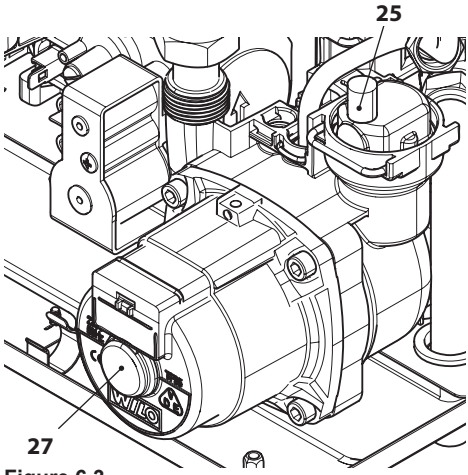


Figure 6.3

- Open the radiator cocks.
- Fill the heating circuit, see section "Filling the heating circuit" on page 15 .
- Bleed the radiators and the various high points of the installation, then reclose any manual bleeding devices.
- Remove the cap 27 in Figure 6.3 and release the pump by turning the rotor using a screwdriver.
  Bleed the pump during this operation.
- Close the pump cap.
- Complete filling the heating system.
  The installation as well as the pump must be bled multiple times.

Fill the condensate discharge siphon with a half litre of water to prevent smoke from exiting at first ignition.
The flue gas intake positioned on the flue gas discharge can be used for this operation (Figure 6.4).

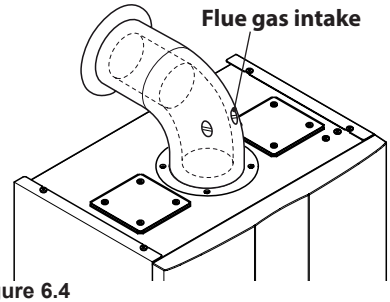


Figure 6.4

- Install the front panel of the body.
- Electrically power the boiler by activating the installed bipolar switch. The LCD display will indicated the symbol ▬ ▬ (Figure 6.5).

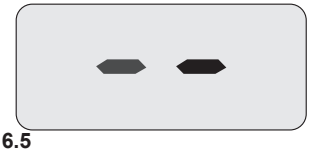


Figure 6.5

- Press key 15 for 2 seconds until the symbols and are displayed Figure 6.6.

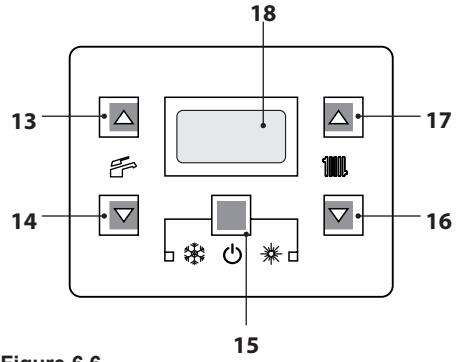


Figure 6.6

The LCD display shows the boiler temperature (primary circuit) and the symbols and ; the symbol °C flashes slowly Figure 6.7.

Figure 6.7

- Open the gas cock
- Make sure that the ambient thermostat is in the position "call for heat".
- Both the correct operation of the boiler, both in d.h.w. mode as well as in heating mode.
- Check the gas pressures and flow rates as shown in section "CHECKING THE GAS REGULATION" on page 53 in this manual.
- Check that the condensate produced during operation fills the siphon and is discharged correctly in the discharge system pipe.
- Turn off the boiler and press key 15 (Figure 6.6) for 2 seconds until the LCD display indicates the symbol ▬ ▬ (Figure 6.5).

- Instruct the user about the correct use of the unit and the following operations:
  - ignition
  - shut off
  - regulation

The user is responsible for keeping the documentation complete and within reach for consultation.

7 CHECKING THE GAS REGULATION

7.1 Warnings

Each time after measuring the gas pressure, properly close all tapping points that were used.
After each gas regulation operation, the valve adjustment components must be sealed.

Attention, danger of electrocution.
The boiler is live during the operations described in this section.
Never touch any electrical part.

7.2 Operations and gas setting

- Remove the front panel on the body, see section "Removing the body panels" on page 61.

Checking the network pressure.

- With the boiler turned off (out of service), check the supply pressure using the tapping point 29 in Figure 7.5 and compare the value read with those shown in the Gas supply pressure table in the "Technical data" section, page 24.
- Properly close the tapping point 29 in Figure 7.5.

Check minimum burner pressure

- Connect a flue analyser to the flue gas analysis outlets on the flue gas exhaust of the boiler Figure 7.1.

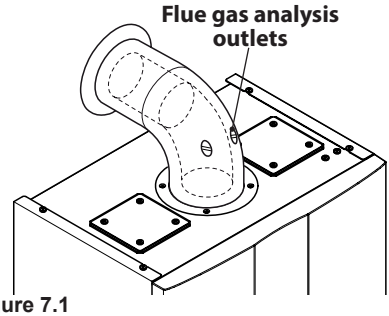


Figure 7.1

- Enter "programming mode" by pressing keys 15 - 16 - 17 (Figure 7.2) together for 10 seconds until the LCD display indicates the letters **Pr** alternating with code **01**, indicating entry in "parameter 01" (Figure 7.3).

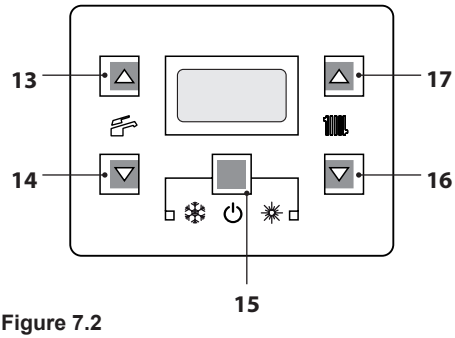


Figure 7.2

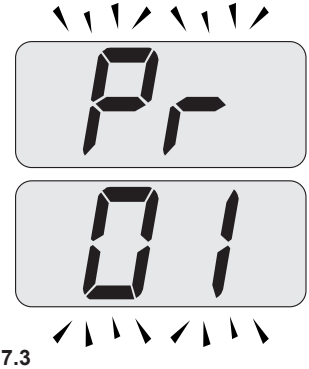


Figure 7.3

- Press keys 16 and 17 (Figure 7.2) together until the LCD displays the letters **LP** that alternate with the minimum heating water temperature (e.g.**45**), indicating the activation of the "chimney sweep function" at minimum power (Figure 7.4).

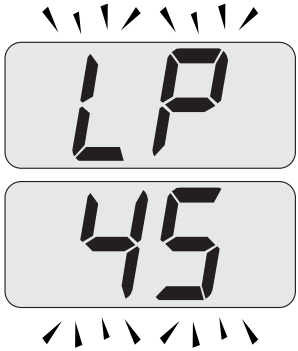


Figure 7.4

- Make sure that the ambient thermostat is in the position "call for heat".

- Withdraw an abundant amount of dhw by opening the cocks.

- Compare the value of **CO_2** read on the flue gas analyser with the one in the "Data in d.h.w. mode" table and the values of **CO_2 at Q.min.** "Technical data" section page 24 (model M160.2025 SM/M) and page 27 (model M160.3035 SM/M).

- To calibrate the boiler **CO_2** (gas pressure at the burner) completely unscrew the protective brass cap **B** and turn the underlying ø 4 mm Allen screw Figure 7.5, turning it clockwise increases the **CO_2**.

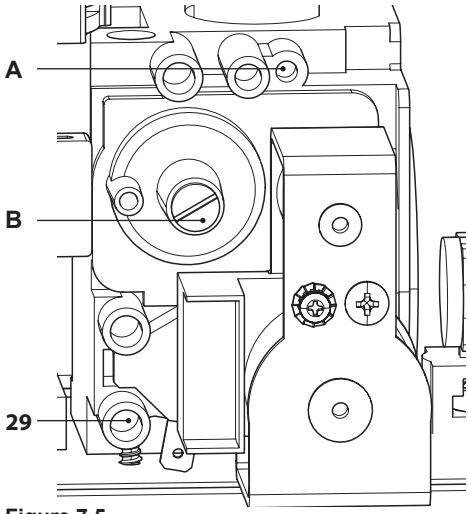


Figure 7.5

Check maximum burner pressure

- Press key 17 3 times until the LCD display indicates the letters **dP** (chimney sweep active in maximum dhw mode) that alternate with the value of the heating water temperature (e.g.**60**), indicating the activation of the "chimney sweep function" at maximum output in dhw mode (Figure 7.6).

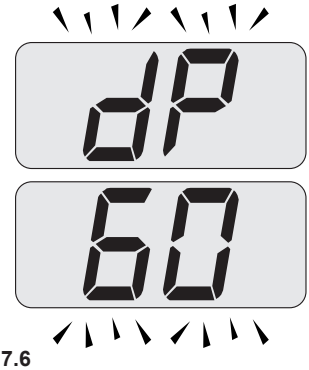


Figure 7.6

- Compare the **CO_2** value read on the flue gas analyser with **CO_2 at Q.nom**. in dhw operation specified in the "Technical data" section in the "Data in d.h.w. mode" table on page

24 (model M160.2025 SM/M) and page 27 (model M160.3035 SM/M).

- If the two values do not coincide, turn the RQ maximum adjustment screw (**A** in Figure 7.5) for the gas valve and calibrate the **CO_2** to the same value specified in the "Technical data" section in the "Data in d.h.w. mode" table on page 24 (model M160.2025 SM/M) and page 27 (model M160.3035 SM/M). Turning it clockwise, the **CO_2** decreases.

- Press key 16 (Figure 7.2) until the LCD display indicates the letters **LP** that alternate with the heating water temperature (e.g.**60**), indicating the activation of the "chimney sweep function" at minimum output in dhw mode (Figure 7.7).

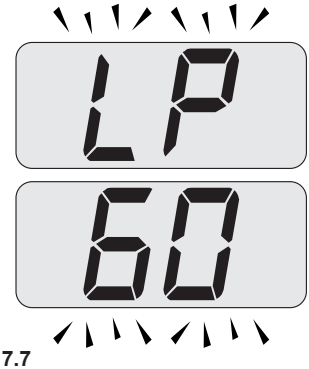


Figure 7.7

- Check that the value of **CO_2 at Q min.** has not gone out of the value range in the "Data in d.h.w. mode" table and the values of **CO_2 at Q.min.** "Technical data" section on page 24 (model M160.2025 SM/M) and page 27 (model M160.3035 SM/M).

- Close the domestic hot water cocks.
- Turn off the boiler and press key 15 (Figure 7.2) for 2 seconds until the LCD display indicates the symbol ▬ ▬ (Figure 7.8).

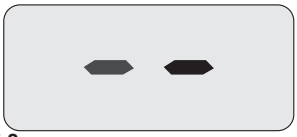


Figure 7.8

During the operations for checking burner maximum and minimum pressure, check the flow rate of the gas to the meter and compare its value with the gas flow rate data, see the "Technical data" section on page 24 (model M160.2025 SM/M) and page 27 (model M160.3035 SM/M).

Reclose the flue gas analysis outlets.

7.3 Regulation of the useful power in heating mode

Regulation of the useful power in heating mode is independent of the one for the dhw setting.

The graph in Figure 7.9 shows how the useful power of the boiler varies as the value set in the control card varies.

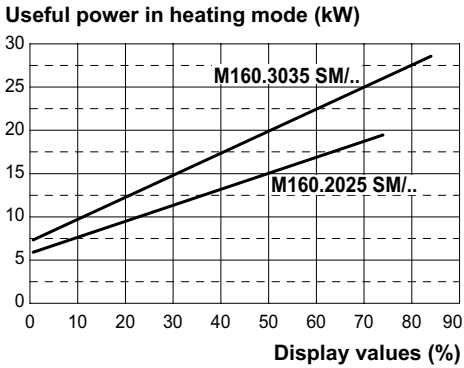


Figure 7.9

Record the calibrated power value in the system manual and also add the useful efficiency value, see following graphs.

Useful efficiency at 30°/50° C (%)

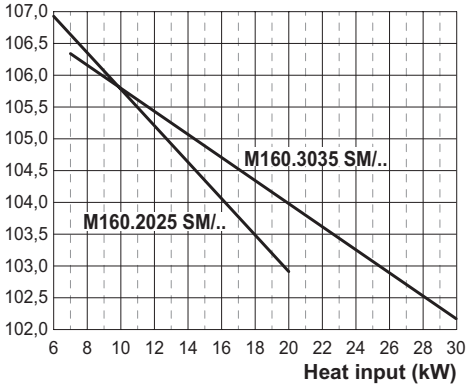


Figure 7.10

Useful efficiency at 60°/80° C (%)

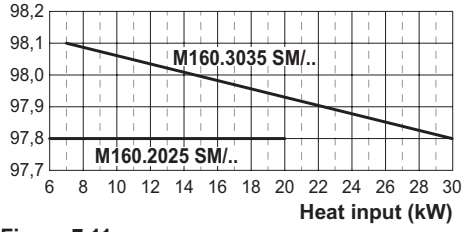


Figure 7.11

Sequence for setting the useful power in heating mode.

- Enter "programming mode" by pressing keys 15 - 16 - 17 (Figure 7.12) together for 10 seconds until the LCD display indicates the letters **Pr** that alternate with the code **01**, indicating entry in "parameter 01" (Figure 7.13).

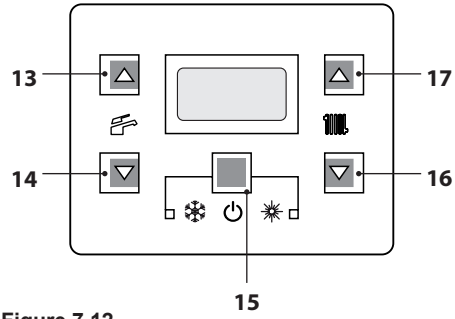


Figure 7.12

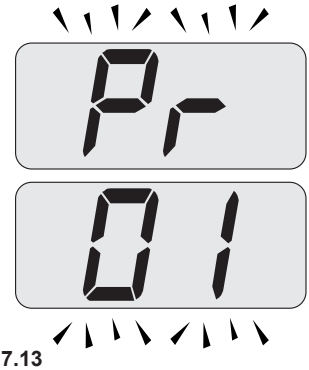


Figure 7.13

- Scroll the various parameters using keys 16 or 17 until the LCD display indicates the letters **Pr**, alternating with the code **12**, indicating entry in "parameter 12" (Figure 7.14).

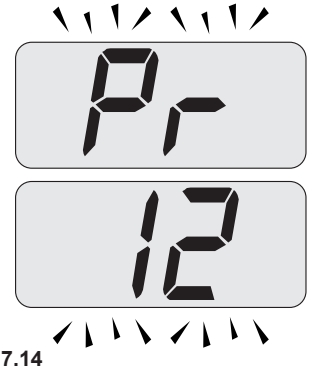


Figure 7.14

- Press keys 15 and 17 (Figure 7.12) at the same time until the LCD display indicates the value of parameter 12 (Figure 7.15) (74=M160.2025 SM/M or 86=M160.3035 SM/M).

Figure 7.15

- Using keys 16 or 17 (Figure 7.12) it is possible to change the value of parameter 12 (see the graph Figure 7.9 to determine the correct value in function of the useful heating power).
- By pressing key 15 (Figure 7.12) confirmation of the inserted value is obtained.
- By pressing keys 15 and 16 (Figure 7.12) together, you will exit without changing the value (return to parameter list Figure 7.14)
- Press keys 15 - 16 - 17 (Figure 7.12) together for 10 seconds to exit "programming mode".

8 GAS CONVERSION

8.1 Warnings

The operations for adapting the boiler to the type of gas available must be performed by an Authorised Service Centre.

The components used for adapting to the type of gas available must only be done using original spare parts.
For instructions regarding calibrating the boiler gas valve, refer to section "CHECKING THE GAS REGULATION" on page 53.

8.2 Operations and gas setting

Check that the gas cock mounted on the gas piping to the boiler is closed and that the unit is not powered.

- Remove the front panel of the body and turn the control panel towards you as shown in section "Maintenance" on page 60.
- Remove the clip **A**, unscrew the swivel joint **C** and remove the gas pipe **B** (Figure 8.1).

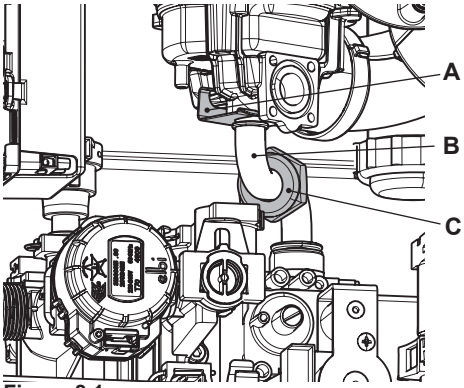


Figure 8.1

- Convert the type of gas by correctly replacing the gas diaphragm (Figure 8.2), referring to the "Technical data" section on page 24 (model M160.2025 SM/M) and page 27 (model M160.3035 SM/M).

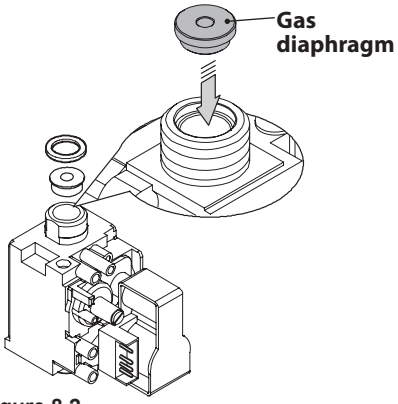


Figure 8.2

Attention - for reassembly, carry out the performed operations in reverse order, being careful not to ruin the gas pipe OR gasket when the pipe is inserted in the aerotech and perform the gas tightness test after tightening the gas pipe swivel joint (Figure 8.1).

The boiler is set in the factory to operate with natural gas (G20).

To set boiler operation with **LPG** gas **(G30 - G31)** carry out the following settings:

- Enter "programming mode" by pressing keys 15 - 16 - 17 (Figure 8.3) together for 10 seconds until the LCD display indicates the letters **Pr** alternating with code **01**, indicating entry in "parameter 01" (Figure 8.4).

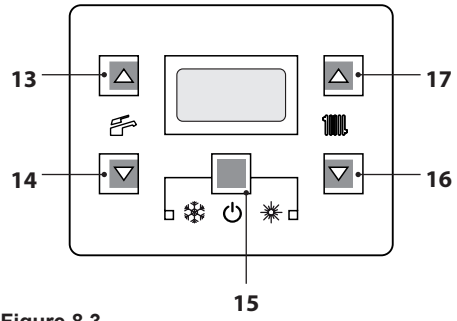


Figure 8.3

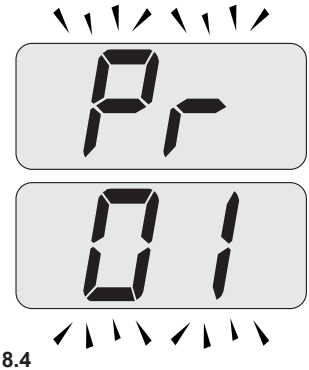


Figure 8.4

- Scroll the various parameters using keys 16 or 17 until the LCD display indicates the letters **Pr**, alternating with the code **05**, indicating entry in "parameter 05" (Figure 8.5).

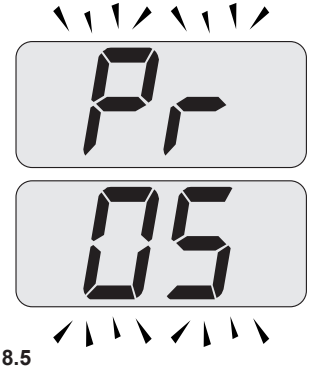


Figure 8.5

- Press keys 15 and 17 (Figure 8.3) at the same time until the LCD display indicates the value of parameter 05 (00=G20) (Figure 8.6).

Figure 8.6

- Pressing the key 17 3 times, it is possible to change the value of parameter 05 from **00=**G20 to **05=**G31 which is correct for LPG gas.
- By pressing key 15 (Figure 8.3) confirmation of the inserted value is obtained.
- By pressing keys 15 and 16 (Figure 8.3) together, you will exit without changing the value (return to parameter list Figure 8.5)
- Press keys 15 - 16 - 17 (Figure 8.3) together for 10 seconds to exit "programming mode".
- Calibrate the gas valve according to the instructions in section "CHECKING THE GAS REGULATION" on page 53.
- Reposition the control panel and remount the front panel of the body.
- Apply the label indicating the type of gas and the pressure value for which the unit is regulated. The self-adhesive label is included in the transformation kit.

9 MAINTENANCE

9.1 Warnings

The operations described in this chapter must only be performed by professionally qualified personnel, therefore you are advised to contact an Authorised Service Centre.

For efficient and continuous operation, the user must have maintenance and cleaning carried out once a year by an Authorised Service Centre technician. If these operations are not carried out, damage to components and boiler operation problems will not be covered by the conventional warranty.

Before performing any cleaning or maintenance operation or before opening or removing the boiler panels, **isolate the unit from the electric power supply** using the bipolar switch installed on the plant and **close the gas cock**.

9.2 Programming the maintenance period

- Enter "programming mode" by pressing keys 15 - 16 - 17 (Figure 9.1) together for 10 seconds until the LCD display indicates the letters **Pr** alternating with code **01**, indicating entry in "parameter 01" (Figure 9.2).

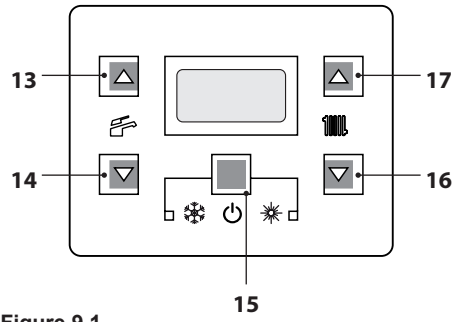


Figure 9.1

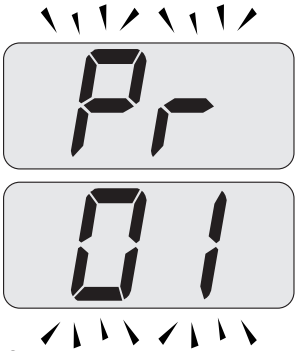


Figure 9.2

- Scroll the various parameters using keys 16 or 17 until the LCD display indicates the letters **Pr**, alternating with the code **28**, indicating entry in "parameter 28" (Figure 9.3).

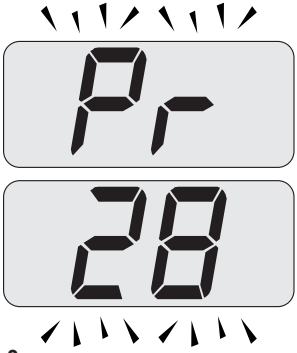


Figure 9.3

- Press keys 15 and 17 (Figure 9.1) at the same time until the LCD display indicates the value of parameter 28 (e.g.**12** default value) (Figure 9.4).

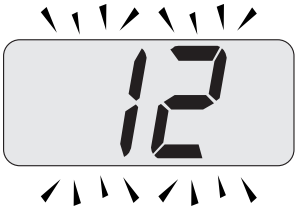


Figure 9.4

- Pressing key 17 makes it possible to change

the value of parameter 28 from **0** to **48** months. It is possible to set parameter 28 to **99** thereby disabling the maintenance request (symbol will disappear from the display).

- By pressing key 15 (Figure 9.1) confirmation of the inserted value is obtained.
- By pressing keys 15 and 16 (Figure 9.1) together, you will exit without changing the value (return to parameter list Figure 9.3).
- Press keys 15 - 16 - 17 (Figure 9.1) together for 10 seconds to exit "programming mode".

9.3 Removing the body panels

Front panel

- Unscrew the screws A and remove the front panel D by pulling it towards you and then pushing it upwards in order to free it from the upper seats (Figure 9.5 and Figure 9.6).

Side panels

Loosen the screws B and C in Figure 9.5 and remove the two side panels E and F push them outwards.

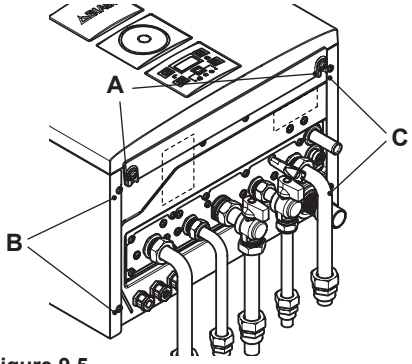


Figure 9.5

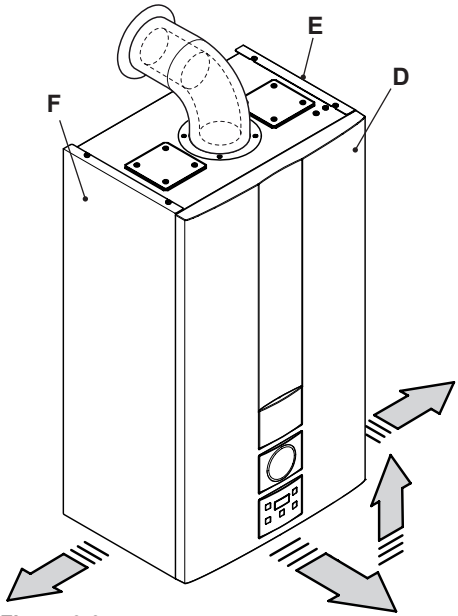


Figure 9.6

Control panel

Turn the control panel G, as shown in Figure 9.7, to access the components inside the boiler in an optimal manner.

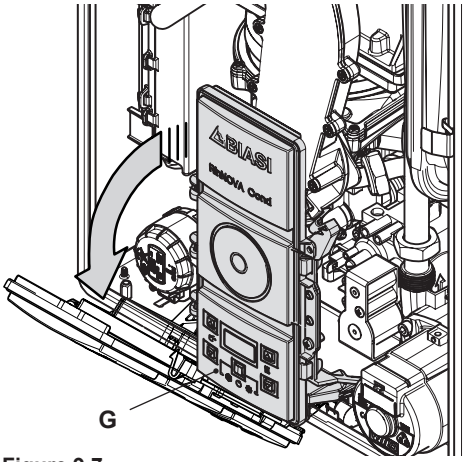


Figure 9.7

9.4 Reinstalling the body panels

Side panels

Reinstall the side panels E and F following the operations described in section "Removing the body panels" on page 61 in reverse order.

Front panel

- Install the front panel D, hooking its upper section.
- Press the spring inwards and at the same time, push the front panel D until completely engaged (Figure 9.8) sequence 1-2.
- Repeat the same sequence on the opposite side of the front panel D, (Figure 9.8) sequence 3-4.
- Make sure that the edge of the front panel is completely flush with the side panels.
- Block the front panel D using the specific screws A (Figure 9.5).

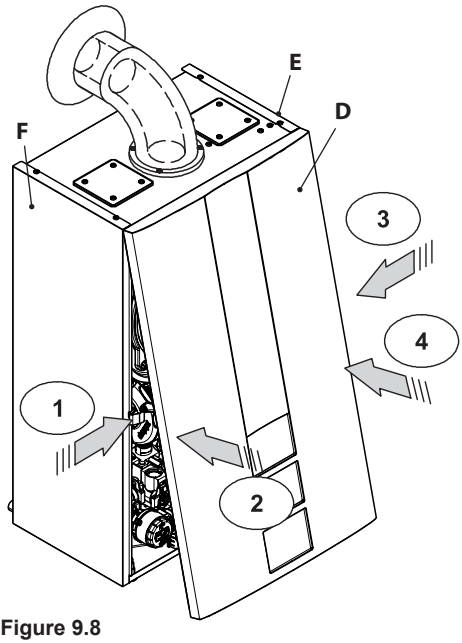


Figure 9.8

9.5 Emptying the d.h.w. circuit

- Close the installed d.h.w. inlet cocks .
- Open the system's domestic hot water cocks.

9.6 Emptying the heating circuit

- Close the installed heating system delivery and return cocks.
- Loosen the heating circuit drain cock 10 indicated in Figure 9.9.

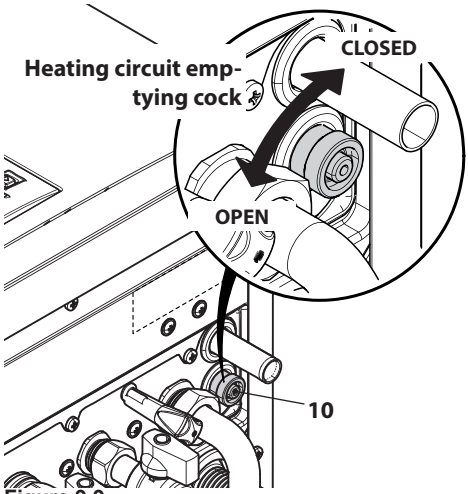


Figure 9.9

- To make draining easier, lift the 25 automatic bleed valve cap in Figure 9.10.

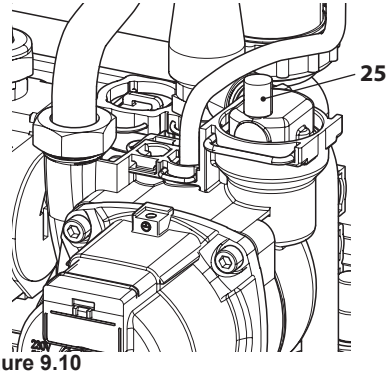


Figure 9.10

9.7 Cleaning the primary condensate exchanger and the burner

- Removal of the burner fan unit 40 in Figure 9.11.

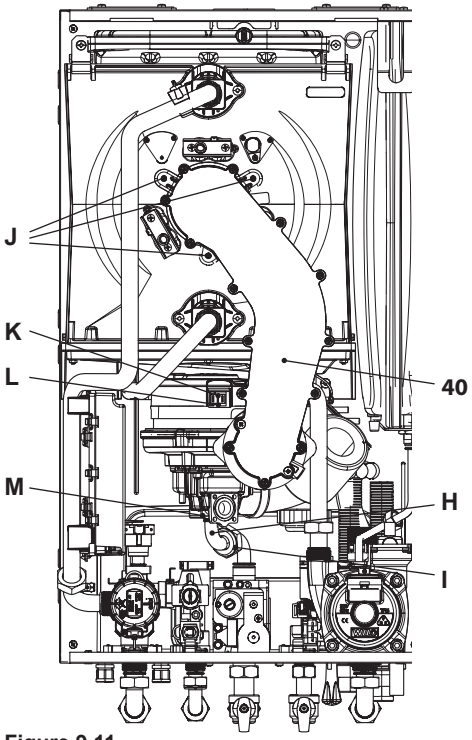


Figure 9.11

- Remove the front panel of the body and turn the control panel (section "Removing the body panels" on page 61).
- Unscrew the gas swivel joint I, remove the clip M and then remove the pipe H.
- Release the silencer pipe.
- Insert a flat screw driver in the recess L of the connector K and pry it downwards, at the same time disconnect the connector K by pulling it towards the front (Figure 9.11).

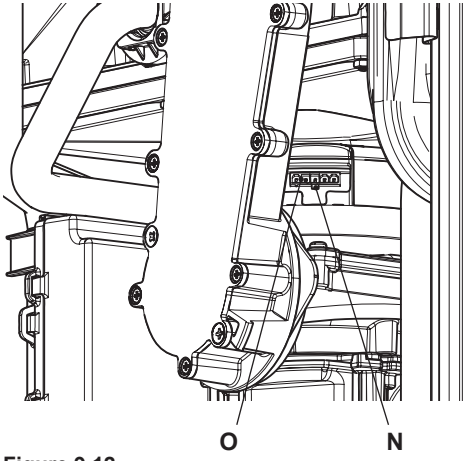


Figure 9.12

- Disconnect the fan connector O by pressing the plastic hook N located below the connector (Figure 9.12).
- Unscrew the screws J and remove the burner fan unit 40 (Figure 9.11).
- Extract the burner casing by pulling it outwards.

If there is any dirt on the elements of the primary condensate exchanger (which can be seen after removing the burner casing), brush it with a bristle brush and then remove the dirt using a vacuum cleaner.

The burner does not require particular maintenance, simply dust it off using a bristle brush.
More specific maintenance will be assessed and performed by a technician from an Authorised Service Centre.

For reassembly, carry out the performed operations in reverse order, being careful not to ruin the gas pipe OR gasket when the pipe is inserted in the aerotech and perform the gas tightness test after tightening the gas pipe swivel joint.

9.8 Check the pressure in the heating expansion tank

Empty the heating circuit as described in section "Emptying the heating circuit" on page 62 and check that the expansion tank pressure is not less than 1 bar.
If the pressure is lower, correct the pressure.

9.9 Cleaning the domestic hot water exchanger

Descaling the domestic hot water exchanger will be assessed by a technician from an Authorised Service Centre, who will perform the cleaning using specific products.

9.10 Controlling the flue gas exhaust duct

Have a technician from an Authorised Service Centre periodically check (at least once a year) the condition of the flue gas exhaust duct, the air duct and the efficiency of the flue gas safety circuit.

9.11 Checking boiler efficiency

Carry out performance checks at the intervals provided by the laws in force.

- Connect a flue analyser to the flue gas analysis outlets on the flue gas exhaust of the boiler Figure 9.13.

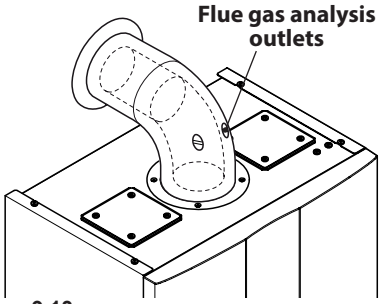


Figure 9.13

- Activate the "chimney sweep function" at maximum output in heating mode (section "Setting the boiler chimney sweep function" on page 65)
- Make sure that the ambient thermostat is in the position "heat demand".
- Withdraw an abundant amount of dhw by opening the cocks.
- Check the combustion of the boiler using the outlets located on the flue pipes (Figure 9.13) and compare the data measured with the following.

Model M160.2025SM		
Nominal heat input	kW	20,0
Nominal efficiency	%	97,8
Combustion efficiency	%	98,2
Air index	n	1,2
Composition of CO2 fumes	%	8,9 - 9,7
Composition of O2 fumes	%	3,8
Composition of CO fumes	ppm	160
Flue gas temperature	°C	75

Values refer to tests with 80 mm 1 + 1 m twin pipe discharge and Methane gas G20 and with heating delivery/return temperature of 60°/80°C

Figure 9.14

Model M160.3035SM		
Nominal heat input	kW	30,0
Nominal efficiency	%	97,8
Combustion efficiency	%	98,2
Air index	n	1,2
Composition of CO2 fumes	%	8,9 - 9,7
Composition of O2 fumes	%	3,8
Composition of CO fumes	ppm	160
Flue gas temperature	°C	80

Values refer to tests with 80 mm 1 + 1 m twin pipe discharge and Methane gas G20 and with heating delivery/return temperature of 60°/80°C

Figure 9.15

9.12 Checking the condensate discharge siphon

- The condensate discharge siphon 33 (Figure 9.16) does not require particular maintenance. Simply check:
- That solid deposits have not formed and remove them if necessary.
- That the condensate discharge pipes are not obstructed.

Unscrew the cap to clean inside the siphon.

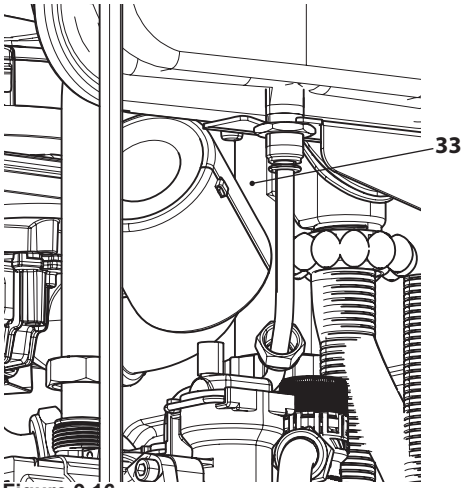


Figure 9.16

9.13 Setting the boiler chimney sweep function

With the boiler set to chimney sweep mode, some automatic boiler functions can be excluded, which makes check and control operations easier.

- Enter "programming mode" by pressing keys 15 - 16 - 17 (Figure 9.17) together for 10 seconds until the LCD display indicates the letters **Pr** alternating with code **01**, indicating entry in "parameter 01" (Figure 9.18).

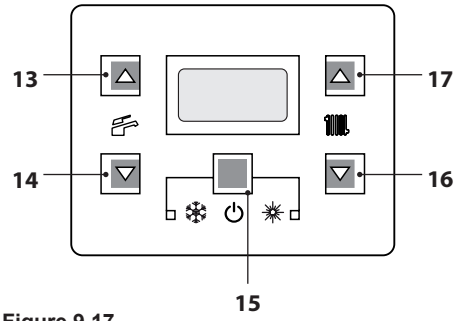


Figure 9.17

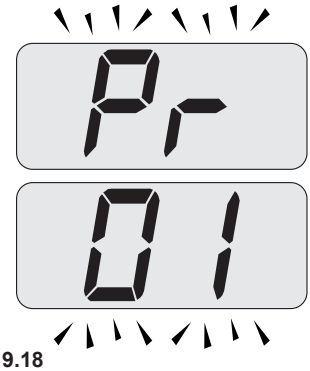


Figure 9.18

<u>Chimney sweep function at minimum output in domestic hot water mode</u>

- Press keys 16 and 17 (Figure 9.17) together until the LCD displays the letters **LP** that alternate with the minimum heating water temperature (e.g.**45**), indicating the activation of the "chimney sweep function" at minimum power in d.h.w. mode (Figure 9.19).

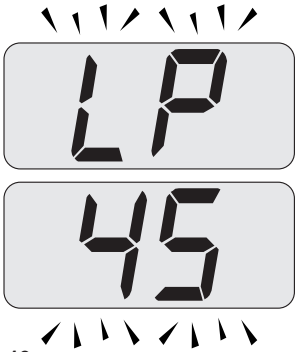


Figure 9.19

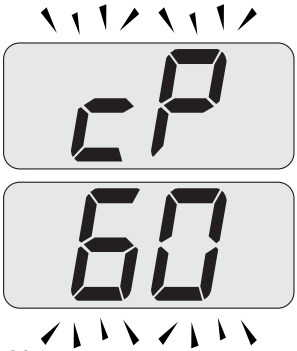


Figure 9.21

Chimney sweep function at minimum output in heating mode

- Press key 17 (Figure 9.17) to vary the output in chimney sweep mode: when the LCD displays the letters **hP** that alternate with the temperature of the heating water (e.g. **32**), the "chimney sweep function" is at maximum output in heating mode (Figure 9.20).

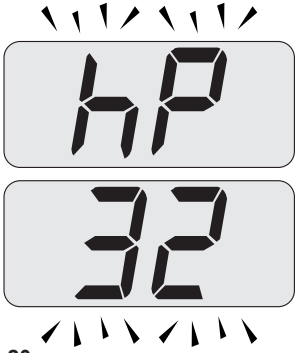


Figure 9.20

Chimney sweep function at maximum output in heating mode

- Press key 17 to vary the output in chimney sweep mode: when the LCD displays the letters **cP** that alternate with the temperature of the heating water (e.g. **60**), the "chimney sweep function" is at maximum output in heating mode (Figure 9.21);

Chimney sweep function at maximum output in domestic hot water mode

- Press key 17 again to vary the output in chimney sweep mode: when the LCD displays the letters **dP** that alternate with the temperature of the heating water (e.g. **60**), the "chimney sweep function" is at maximum output in domestic hot water mode (Figure 9.22);

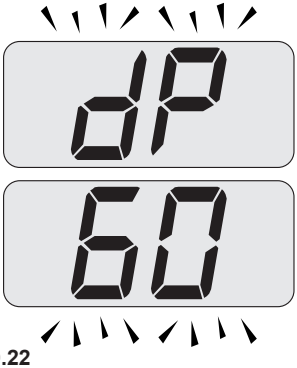


Figure 9.22

- Press again keys 15 - 16 - 17 (Figure 9.17) for 10 seconds to exit "chimney sweep mode" and return to the previously set boiler status (Figure 9.23).

Winter

Summer

Figure 9.23

9.14 Settings for changing the control card

When the control card is replaced , it must be configured for the exact boiler type.

Important: In order to check boiler operation and change any parameters set in the factory, the table shown in Figure 9.24 must be filled out with the values that are displayed when scrolling the control card configuration parameters.

This makes it possible to correctly adjust this boiler if the control card is replaced.

PARAMETERS	LCD	VALUE
Boiler model/type	**Pr 01**	
Water sensors configuration	**Pr 02**	
Not used	**Pr 03**	----------
Not used	**Pr 04**	----------
Type of gas	**Pr 05**	
Not used	**Pr 06**	----------
Maximum heating delivery temperature °C	**Pr 07**	
Reset (restores the factory parameters)	**Pr 08**	
Chimney sweep	**Pr 09**	
Reignition frequency in heating mode	**Pr 10**	
Pump post-circulation	**Pr 11**	
Regulation of the useful power in heating mode	**Pr 12**	
Pump mode operation	**Pr 13**	
Burner ignition power	**Pr 14**	
Value of the external probe K	**Pr 15**	
Regulation of the minimum power in heating mode	**Pr 16**	
Burner shut off in function of d.h.w. temp.	**Pr 17**	
Heating NTC on delivery	**Pr 18**	
User interface	**Pr 19**	
Not used	**Pr 20**	----------
Not used	**Pr 21**	----------
Not used	**Pr 22**	----------
Not used	**Pr 23**	----------
Not used	**Pr 24**	----------
Not used	**Pr 25**	----------
Not used	**Pr 26**	----------
Minimum heating return temperature °C	**Pr 27**	
Maintenance due	**Pr 28**	
Not used	**Pr 29**	----------
Correct primary system pressure	**Pr 30**	

Figure 9.24

- Enter "programming mode" by pressing keys 15 - 16 - 17 (Figure 9.25) at the same time for 10 seconds until the LCD display indicates

the letters **Pr** that alternate with the code **01** indicating entry in "parameter 01" (Figure 9.26).

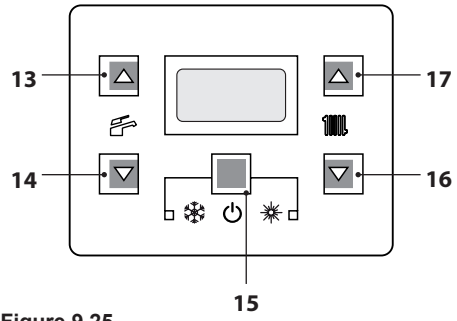


Figure 9.25

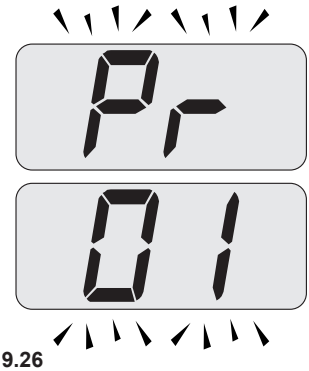


Figure 9.26

- Press keys 15 and 17 (Figure 9.25) until the LCD display indicates the value of parameter 01 (Figure 9.27) (01=M160.2025 SM/M or 03=M160.3035 SM/M).

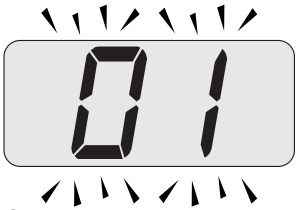


Figure 9.27

- By pressing keys 15 and 16 (Figure 9.25) together, you will exit without changing the value (return to parameter list Figure 9.26)
- Scroll the various parameters using keys 16 or 17 until the LCD display indicates the letters **Pr**, alternating with the code **02**, indicating entry in "parameter 02".
- Repeat the previous steps to display the value and proceed to the next parameter.
- Set the following parameter:

PARAMETER	LCD	VALUE
Maximum heating delivery temperature °C	**Pr 07**	80

- Press keys 15 - 16 - 17 (Figure 9.25) together for 10 seconds to exit "programming mode".

NOTES

NOTES

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BSG Caldaie a Gas S.p.a. – Biasi Group
Sales and administrative headquarters,
plant and technical support
33170 PORDENONE (Italy) – Via Pravolton, 1/b

+39 0434.238311
+39 0434.238312
www.biasi.it

Sales headquarters
+39 0434.238400

Technical support
+39 0434.238387

Registered office
Via Leopoldo Biasi, 1 – 37135 VERONA

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